State:	*Arkansas*	***First Filing Company:***	*United Services Automobile Association, ...*
TOI/Sub-TOI:	*30.1 Dwelling Fire/Personal Liability/30.1000 Dwelling Fire/Personal Liability*		
Product Name:	*Rental Property Insurance Program*		
Project Name/Number:	*Rates and Rules/AR1418381*		

Filing at a Glance

Companies:	United Services Automobile Association USAA Casualty Insurance Company USAA General Indemnity Company Garrison Property and Casualty Insurance Company
Product Name:	Rental Property Insurance Program
State:	Arkansas
TOI:	30.1 Dwelling Fire/Personal Liability
Sub-TOI:	30.1000 Dwelling Fire/Personal Liability
Filing Type:	Rate/Rule
Date Submitted:	06/27/2014
SERFF Tr Num:	USAA-129604199
SERFF Status:	Closed-Filed
State Tr Num:	
State Status:	
Co Tr Num:	AR1418381
Effective Date Requested (New):	10/31/2014
Effective Date Requested (Renewal):	01/01/2015
Author(s):	Nick Almendarez, Heather Arriola
Reviewer(s):	Becky Harrington (primary)
Disposition Date:	08/20/2014
Disposition Status:	Filed
Effective Date (New):	10/31/2014
Effective Date (Renewal):	01/01/2015

State Filing Description:

General Information

Project Name: Rates and Rules
Project Number: AR1418381
Reference Organization:
Reference Title:
Filing Status Changed: 08/20/2014
State Status Changed:
Created By: Nick Almendarez
Corresponding Filing Tracking Number:

Status of Filing in Domicile: Authorized
Domicile Status Comments:
Reference Number:
Advisory Org. Circular:

Deemer Date:
Submitted By: Nick Almendarez

Filing Description:

United Services Automobile Association (USAA), USAA Casualty Insurance Company (USAA-CIC), USAA General Indemnity Company (USAA-GIC), and Garrison Property and Casualty Insurance Company (Garrison) are filing our DP-2013 Rental Property Insurance Program to replace our current Dwelling Fire (DP) and Dwelling Liability (DL) Programs.

We are proposing a new rating plan that revises the rating formula and introduces structures that will improve USAA's ability to offer a fair and competitive rate. Renewal premiums will be capped to mitigate the impact of this revision.

In addition, we are introducing an underwriting tier rating plan using several underwriting variables to include credit-based insurance scores. Please see the attached Underwriting Tier Placement Guidelines for additional information.

Please note that we consider the enclosed Detailed Underwriting Tier Placement Guidelines as confidential and ask that they be exempt from public disclosure.

A complete set of rate and rule manual pages are enclosed.

At this time we intend to continue using the territory definitions used with our current Dwelling Fire Program which are those in the Insurance Services Office (ISO) Dwelling Policy Program Manual for Arkansas.

The contracts and endorsements for our new program are being submitted in a separate forms filing.

Company and Contact

Filing Contact Information

Nick Almendarez, Compliance Analyst
A-03-W Insurance Regulatory Compliance
9800 Fredericksburg Road
San Antonio, TX 78288-1033

nick.almendarez@usaa.com
800-531-8722 [Phone] 82844 [Ext]
210-498-5081 [FAX]

State:	Arkansas	**First Filing Company:**	United Services Automobile Association, ...
TOI/Sub-TOI:	30.1 Dwelling Fire/Personal Liability/30.1000 Dwelling Fire/Personal Liability		
Product Name:	Rental Property Insurance Program		
Project Name/Number:	Rates and Rules/AR1418381		

Filing Company Information

United Services Automobile Association 9800 Federicksburg Road San Antonio, TX 78288 (800) 531-8722 ext. [Phone]	CoCode: 25941 Group Code: 200 Group Name: USAA FEIN Number: 74-0959140	State of Domicile: Texas Company Type: Reciprocal State ID Number:
USAA Casualty Insurance Company 9800 Fredericksburg Road San Antonio, TX 78288 (800) 531-8722 ext. [Phone]	CoCode: 25968 Group Code: 200 Group Name: USAA FEIN Number: 59-3019540	State of Domicile: Texas Company Type: Stock State ID Number:
USAA General Indemnity Company 9800 Fredericksburg Road San Antonio, TX 78288 (800) 531-8722 ext. [Phone]	CoCode: 18600 Group Code: 200 Group Name: USAA FEIN Number: 74-1718283	State of Domicile: Texas Company Type: Stock State ID Number:
Garrison Property and Casualty Insurance Company 9800 Fredericksburg Road San Antonio, TX 78284-8496 (800) 531-8722 ext. [Phone]	CoCode: 21253 Group Code: 200 Group Name: USAA FEIN Number: 43-1803614	State of Domicile: Texas Company Type: Stock State ID Number:

Filing Fees

Fee Required?	Yes
Fee Amount:	$100.00
Retaliatory?	No
Fee Explanation:	For rate/rule filing: $100.00 filing fee per filing.
Per Company:	No

Company	Amount	Date Processed	Transaction #
United Services Automobile Association	$100.00	06/27/2014	83552019

Correspondence Summary

Dispositions

Status	Created By	Created On	Date Submitted
Filed	Becky Harrington	08/20/2014	08/20/2014

Objection Letters and Response Letters

Objection Letters

Status	Created By	Created On	Date Submitted
Pending Industry Response	Becky Harrington	08/04/2014	08/04/2014
Pending Industry Response	Becky Harrington	06/30/2014	06/30/2014

Response Letters

Responded By	Created On	Date Submitted
Nick Almendarez	08/15/2014	08/15/2014
Nick Almendarez	07/28/2014	08/04/2014

Disposition

Disposition Date: 08/20/2014
Effective Date (New): 10/31/2014
Effective Date (Renewal): 01/01/2015
Status: Filed

Comment:

Company Name:	Overall % Indicated Change:	Overall % Rate Impact:	Written Premium Change for this Program:	Number of Policy Holders Affected for this Program:	Written Premium for this Program:	Maximum % Change (where req'd):	Minimum % Change (where req'd):
United Services Automobile Association	%	0.000%	$0	3,364	$3,248,826	25.000%	-25.000%
USAA Casualty Insurance Company	%	-2.300%	$-18,705	606	$813,241	25.000%	-25.000%
USAA General Indemnity Company	%	4.500%	$21,663	381	$481,394	25.000%	-25.000%
Garrison Property and Casualty Insurance Company	%	-1.700%	$-3,407	153	$200,430	25.000%	-25.000%

Overall Rate Information for Multiple Company Filings	
Overall Percentage Rate Indicated For This Filing	0.000%
Overall Percentage Rate Impact For This Filing	0.000%
Effect of Rate Filing-Written Premium Change For This Program	$-449
Effect of Rate Filing - Number of Policyholders Affected	4,504

Schedule	Schedule Item	Schedule Item Status	Public Access
Supporting Document	Form RF-2 Loss Costs Only (not for workers' compensation)		Yes
Supporting Document	H-1 Homeowners Abstract	Filed	Yes
Supporting Document	HPCS-Homeowners Premium Comparison Survey	Filed	Yes
Supporting Document (revised)	NAIC loss cost data entry document	Filed	Yes
Supporting Document	NAIC loss cost data entry document		Yes
Supporting Document	AR Rental Property Insurance Explanatory Memorandum	Filed	Yes

Schedule	Schedule Item	Schedule Item Status	Public Access
Supporting Document	CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group	Filed	No
Supporting Document	AIR EQ Model for the U.S.	Filed	Yes
Supporting Document	Attract One NCOIL	Filed	Yes
Supporting Document	Exhibit I	Filed	Yes
Supporting Document	Exhibit II	Filed	Yes
Supporting Document	Exhibit III	Filed	Yes
Supporting Document	Exhibit IV	Filed	Yes
Supporting Document	Exhibit V	Filed	Yes
Supporting Document	Exhibit VI - USAA & Exhibit VI - CIC Group	Filed	Yes
Rate (revised)	AR Rental Property Insurance Rate and Rule Manual	Filed	Yes
Rate	AR Rental Property Insurance Rate and Rule Manual		Yes
Rate	AR Rental Property Insurance Underwriting Tier Placement Guidelines - USAA Group	Filed	Yes

State:	Arkansas	**First Filing Company:**	United Services Automobile Association, ...
TOI/Sub-TOI:	30.1 Dwelling Fire/Personal Liability/30.1000 Dwelling Fire/Personal Liability		
Product Name:	Rental Property Insurance Program		
Project Name/Number:	Rates and Rules/AR1418381		

Objection Letter

Objection Letter Status	Pending Industry Response
Objection Letter Date	08/04/2014
Submitted Date	08/04/2014
Respond By Date	

Dear Nick Almendarez,

Introduction:

This will acknowledge receipt of the recent response.

Objection 1

- Exhibit I (Supporting Document)

Comments: Based upon the previous objection requesting systematic components and random components that comprised the response variables, am I to understand that for the dwelling fire model only fire incurred loss and earned house years were used as components? Please provide a detailed explanation for Exhibit I provide in the response.

Objection 2

Comments: Provide a histogram detailing the actual impact (uncapped) on current insureds.

Please indicate if any capping is anticipated.

Objection 3

- NAIC loss cost data entry document (Supporting Document)

Comments: Please provide the required forms. (I apologize for the oversight. I originally thought this was a new program applying to new business only)

Conclusion:

NOTICE regarding, corrections to filings and scrivener's Errors:

Arkansas does not allow the re-opening of closed filings for corrections, changes in effective dates, scrivener's errors, amendments or substantive changes. Please see the General Instructions for how these events will be handled after the effective date of the change."

In accordance with Regulation 23, Section 7.A., this filing may not be implemented until 20 days after the requested amendment(s) and/or information is received.

Sincerely,

Becky Harrington

State:	Arkansas	**First Filing Company:**	United Services Automobile Association, ...
TOI/Sub-TOI:	30.1 Dwelling Fire/Personal Liability/30.1000 Dwelling Fire/Personal Liability		
Product Name:	Rental Property Insurance Program		
Project Name/Number:	Rates and Rules/AR1418381		

Objection Letter

Objection Letter Status	Pending Industry Response
Objection Letter Date	06/30/2014
Submitted Date	06/30/2014
Respond By Date	

Dear Nick Almendarez,

Introduction:

This will acknowledge receipt of the captioned filing.

Objection 1

- AR Rental Property Insurance Explanatory Memorandum (Supporting Document)

Comments: Provide all response variables (systematic component and random component) used in the GLM.

Objection 2

- AR Rental Property Insurance Explanatory Memorandum (Supporting Document)

Comments: Please identify the exact version of Emblem used.

Objection 3

- AR Rental Property Insurance Explanatory Memorandum (Supporting Document)

Comments: Provide the USA_Eq Time Dep v.8.03.107 model. What consideration was give to soil content in AR?

Objection 4

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)

Comments: Provide the actual scoring model or identify the filing in which it was previously filed.

Objection 5

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)

Comments: Explain how the treatment of tenured insureds combined with the insurance score complies with ACA 23-67-208. Provide additional actuarial supporting information.

Objection 6

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)

Comments:

Pursuant to ACA 23-67-409, provide the 5 year premium/loss experience for Arkansas justifying the use of credit information in the development of the Financial Responsibility Class factors.

Objection 7

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)

Comments: Please identify the credit neutral tier. No hit/thin files must be treated as credit neutral in compliance with ACA 23-67-405 and Directive 2-2002.

Objection 8

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)

Comments: Provide additional support justifying the use of Enterprise Collateral variables.

Objection 9

- AR Rental Property Insurance Rate and Rule Manual , Complete Manual (Rate)

Comments: Please justify the use of a multi-product discount given the P&C collateral variables.

Objection 10

- AR Rental Property Insurance Rate and Rule Manual , Complete Manual (Rate)

Comments: Please confirm the wind/hail deductible base amount it $500 and other wind/hail higher deductible amounts are optional.

Objection 11

- AR Rental Property Insurance Rate and Rule Manual , Complete Manual (Rate)

Comments: Provide additional documentation supporting the claim surcharge factors.

Objection 12

Comments: The EQ Market Assistance Program (MAP) is a market of last resort for AR insureds. Industry rates must remain at a level below those used in the MAP. The new rating structure is not conducive to determining comparisons and assuring compliance. Please demonstrate how it can be determined that the new rating process meets these requirements. A similar rating structure was not acceptable for homeowners.

Conclusion:

NOTICE regarding, corrections to filings and scrivener's Errors:

Arkansas does not allow the re-opening of closed filings for corrections, changes in effective dates, scrivener's errors, amendments or substantive changes. Please see the General Instructions for how these events will be handled after the effective date of the change."

In accordance with Regulation 23, Section 7.A., this filing may not be implemented until 20 days after the requested amendment(s) and/or information is received.

Sincerely,

Becky Harrington

Response Letter

Response Letter Status	Submitted to State
Response Letter Date	08/15/2014
Submitted Date	08/15/2014

Dear Becky Harrington,

Introduction:

Response 1

Comments:

The previously submitted Exhibit I displayed the response for each model, which was pure premium (Losses/Exposure). Please see Exhibit V for a list of the individual variables included in each model, which represent the systematic components. Our goal with modeling is to eliminate noise (the random component) and express the response variable (pure premium) strictly in terms of the systematic components (the variables in Exhibit V).

Related Objection 1

Applies To:

- Exhibit I (Supporting Document)

Comments: Based upon the previous objection requesting systematic components and random components that comprised the response variables, am I to understand that for the dwelling fire model only fire incurred loss and earned house years were used as components? Please provide a detailed explanation for Exhibit I provide in the response.

Changed Items:

Supporting Document Schedule Item Changes	
Satisfied - Item:	Exhibit V
Comments:	
Attachment(s):	Exhibit V.pdf

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 2

Comments:

Exhibit VI-USAA has been provided with a histogram detailing the impact on current insureds. Approximately 28% of current insureds will be capped at +25% and 13% will be capped at -25%.

Exhibit VI-CIC Group has been provided with a histogram detailing the impact on current insureds. Approximately 27% of current insureds will be capped at +25% and 13% will be capped at -25%.

Related Objection 2

Comments: Provide a histogram detailing the actual impact (uncapped) on current insureds.

Please indicate if any capping is anticipated.

Changed Items:

Supporting Document Schedule Item Changes	
Satisfied - Item:	Exhibit VI - USAA & Exhibit VI - CIC Group
Comments:	
Attachment(s):	Exhibit VI - USAA.pdf Exhibit VI - CIC Group.pdf

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 3

Comments:

The NAIC loss cost data entry documents have been provided. As stated on the filing memo, the overall rate effect for USAA-CIC, USAA-GIC, and Garrison is 0.0%. These companies are analyzed together because they share the same rates and rating structure.

Related Objection 3

Applies To:

- NAIC loss cost data entry document (Supporting Document)

Comments: Please provide the required forms. (I apologize for the oversight. I originally thought this was a new program applying to new business only)

Changed Items:

State:	Arkansas	**First Filing Company:**	United Services Automobile Association, ...
TOI/Sub-TOI:	30.1 Dwelling Fire/Personal Liability/30.1000 Dwelling Fire/Personal Liability		
Product Name:	Rental Property Insurance Program		
Project Name/Number:	Rates and Rules/AR1418381		

Supporting Document Schedule Item Changes	
Satisfied - Item:	NAIC loss cost data entry document
Comments:	
Attachment(s):	FORM RF-1 (USAA).pdf FORM RF-1 (USAA-CIC).pdf FORM RF-1 (USAA-GIC).pdf FORM RF-1 (GARRISON).pdf
Previous Version	
Bypassed - Item:	*NAIC loss cost data entry document*
Bypass Reason:	*Not Applicable.*
Attachment(s):	

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Conclusion:

Sincerely,
Nick Almendarez

Response Letter

Response Letter Status	Submitted to State
Response Letter Date	07/28/2014
Submitted Date	08/04/2014

Dear Becky Harrington,

Introduction:

Response 1

Comments:

Please refer to Exhibit I for a description of the response variables used in each model. Please note that as stated in response to Objection 12, were withdrawing the proposed Earthquake changes.

Related Objection 1

Applies To:

- AR Rental Property Insurance Explanatory Memorandum (Supporting Document)

Comments: Provide all response variables (systematic component and random component) used in the GLM.

Changed Items:

Supporting Document Schedule Item Changes	
Satisfied - Item:	Exhibit I
Comments:	
Attachment(s):	Exhibit I.pdf

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 2

Comments:

Emblem version 4.3.24 was used for this set of models.

Related Objection 2

Applies To:

- AR Rental Property Insurance Explanatory Memorandum (Supporting Document)

Comments: Please identify the exact version of Emblem used.

Changed Items:

No Supporting Documents changed.

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 3

Comments:

The current AIR Earthquake model is attached. Section 4.3 discusses soil content maps. Arkansas information is contained in the CW 500m resolution layer and the New Madrid seismic-zone layer. Please note that as stated in response to Objection 12, were withdrawing the proposed Earthquake changes.

Related Objection 3

Applies To:

- AR Rental Property Insurance Explanatory Memorandum (Supporting Document)

Comments: Provide the USA_Eq Time Dep v.8.03.107 model. What consideration was give to soil content in AR?

Changed Items:

Supporting Document Schedule Item Changes	
Satisfied - Item:	AIR EQ Model for the U.S.
Comments:	
Attachment(s):	AIR EQ Model for the U.S. (Part 1 of 2).pdf AIR EQ Model for the U.S. (Part 2 of 2).pdf

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 4

Comments:

The Attract One scoring model is attached.

Related Objection 4

Applies To:

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)
Comments: Provide the actual scoring model or identify the filing in which it was previously filed.

Changed Items:

Supporting Document Schedule Item Changes	
Satisfied - Item:	Attract One NCOIL
Comments:	
Attachment(s):	Attract One NCOIL 03.14.pdf Attract One Overview - NCOIL 03.14.pdf

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 5

Comments:

Insurance scores do not have an adverse impact on the rates of insureds with twenty-five years of tenure or more. Insurance scores are used to predict future insurance losses. Since we have history with our tenured insureds, we would prefer to rely on other risk factors, such as claims history, non-payment cancellations, and the insureds relationship with USAA, to determine future insurance losses. However, we would still like to provide a benefit to our tenured insureds that have higher than average insurance scores.

Related Objection 5

Applies To:

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)

Comments: Explain how the treatment of tenured insureds combined with the insurance score complies with ACA 23-67-208. Provide additional actuarial supporting information.

Changed Items:

No Supporting Documents changed.

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 6

Comments:

Since this is a new structure, we do not have credit scores available for our Rental Property Insurance line of business. Exhibit II has been provided with five years of premium and loss experience by insurance credit score for our Homeowners line of business.

Related Objection 6

Applies To:

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)

Comments:

Pursuant to ACA 23-67-409, provide the 5 year premium/loss experience for Arkansas justifying the use of credit information in the development of the Financial Responsibility Class factors.

Changed Items:

Supporting Document Schedule Item Changes	
Satisfied - Item:	Exhibit II
Comments:	
Attachment(s):	Exhibit II.pdf

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 7

Comments:

There is no single credit neutral tier because there are several other variables that determine a members tier, such as tenure, enterprise collateral, and military commission source. A member who has a neutral contribution from all tier components will be assigned to tier 36. No hit/thin files are treated as credit neutral.

Related Objection 7

Applies To:

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)

Comments: Please identify the credit neutral tier. No hit/thin files must be treated as credit neutral in compliance with ACA 23-67-405 and Directive 2-2002.

Changed Items:

No Supporting Documents changed.

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 8

Comments:

Exhibit III contains the RPI and Homeowner indicated and selected tier point reductions for Enterprise Collateral. RPI selected factors were chosen to be equivalent to the current Homeowners selections.

Related Objection 8

Applies To:

- CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group (Supporting Document)

Comments: Provide additional support justifying the use of Enterprise Collateral variables.

Changed Items:

Supporting Document Schedule Item Changes	
Satisfied - Item:	Exhibit III
Comments:	
Attachment(s):	Exhibit III.pdf

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 9

Comments:

The RPI Multiple Products discounts were based on the current Homeowners Auto and Home combination discount of 10%, as well as actuarial judgment.

Related Objection 9

Applies To:

- AR Rental Property Insurance Rate and Rule Manual , Complete Manual (Rate)

Comments: Please justify the use of a multi-product discount given the P&C collateral variables.

Changed Items:

No Supporting Documents changed.

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 10

Comments:

The base deductible for all structures in all locations in Arkansas is $500. Higher deductibles are available in most instances but selection of these is optional for the policyholder.

Related Objection 10

Applies To:

- AR Rental Property Insurance Rate and Rule Manual , Complete Manual (Rate)

Comments: Please confirm the wind/hail deductible base amount it $500 and other wind/hail higher deductible amounts are optional.

Changed Items:

No Supporting Documents changed.

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 11

Comments:

Exhibit IV shows the indicated and selected factors for the Claims Activity Surcharge. Accurate policy-level prior claims data for RPI was unavailable, so the shown indicated factors and selections are based on Homeowners data. Weather, wildfire, and catastrophe-related claims will not be surcharged. We are introducing this rating structure with this filing, and no existing business will receive a claims surcharge on renewal into the new program.

Related Objection 11

Applies To:

- AR Rental Property Insurance Rate and Rule Manual , Complete Manual (Rate)

Comments: Provide additional documentation supporting the claim surcharge factors.

Changed Items:

Supporting Document Schedule Item Changes	
Satisfied - Item:	Exhibit IV
Comments:	
Attachment(s):	Exhibit IV.pdf

No Form Schedule items changed.

No Rate/Rule Schedule items changed.

Response 12

Comments:

We have removed the revised Earthquake rates from this filing.

Related Objection 12

Comments: The EQ Market Assistance Program (MAP) is a market of last resort for AR insureds. Industry rates must remain at a level below those used in the MAP. The new rating structure is not conducive to determining comparisons and assuring compliance. Please demonstrate how it can be determined that the new rating process meets these requirements. A similar rating structure was not acceptable for homeowners.

Changed Items:

No Supporting Documents changed.

No Form Schedule items changed.

Rate Schedule Item Changes

Item No.	Exhibit Name	Rule # or Page #	Rate Action	Previous State Filing Number	Date Submitted
1	AR Rental Property Insurance Rate and Rule Manual	Complete Manual	New		08/04/2014 By: Nick Almendarez
Previous Version					
1	*AR Rental Property Insurance Rate and Rule Manual*	*Complete Manual*	*New*		*06/27/2014 By: Nick Almendarez*

Conclusion:

Sincerely,
Nick Almendarez

Rate Information

Rate data applies to filing.

Filing Method: File and Use
Rate Change Type: Neutral
Overall Percentage of Last Rate Revision: 7.000%
Effective Date of Last Rate Revision: 02/22/2013
Filing Method of Last Filing: File and Use

Company Rate Information

Company Name:	Overall % Indicated Change:	Overall % Rate Impact:	Written Premium Change for this Program:	Number of Policy Holders Affected for this Program:	Written Premium for this Program:	Maximum % Change (where req'd):	Minimum % Change (where req'd):
United Services Automobile Association	%	0.000%	$0	3,364	$3,248,826	25.000%	-25.000%
USAA Casualty Insurance Company	%	-2.300%	$-18,705	606	$813,241	25.000%	-25.000%
USAA General Indemnity Company	%	4.500%	$21,663	381	$481,394	25.000%	-25.000%
Garrison Property and Casualty Insurance Company	%	-1.700%	$-3,407	153	$200,430	25.000%	-25.000%

Rate/Rule Schedule

Item No.	Schedule Item Status	Exhibit Name	Rule # or Page #	Rate Action	Previous State Filing Number	Attachments
1	Filed 08/20/2014	AR Rental Property Insurance Rate and Rule Manual	Complete Manual	New		AR RPI Rate and Rule Manual (Revised 8-4-2014).pdf
2	Filed 08/20/2014	AR Rental Property Insurance Underwriting Tier Placement Guidelines - USAA Group	Pages 1 & 2 for each company	New		AR RPI UW Tier Placement Guidelines-USAA Group.pdf

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE (RPI)**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

I. GENERAL RULES

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE (RPI)**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE (RPI)**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)** **JANUARY 1, 2015 (RENEWAL BUSINESS)**
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION** **USAA CASUALTY INSURANCE COMPANY** **USAA GENERAL INDEMNITY COMPANY** **GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY**

I. GENERAL RULES

The Rental Property Insurance (RPI) Program provides property and related coverages using the forms and endorsements referred to in this manual. This manual contains the rules and classifications governing the writing of the Rental Property Insurance policy. The rules, rates, forms and endorsements of the Company for each coverage govern in all cases not specifically provided for in this manual.

Throughout this manual, the term *Dwelling* includes townhouses.

FORMS AVAILABILITY

1. AMOUNT OF INSURANCE AND COVERAGE RELATIONSHIPS

a. The minimum amounts of Insurance under the Rental Property Insurance policy are as follows:

Section I--Property Damage

Coverage	**DP-3**	**DP-3 w/DP-1766 (condo/co-op)**	**DP-3 with No Coverage A**
A -Dwelling Minimum Limit	$10,000	$3,000	N/A
B -Other Structures	10% of A	N/A	$1,000
C -Personal Property (Optional coverage when A or B is included on the policy. If purchased, minimum limits apply)	$2,500	$2,500	$500
D -Fair Rental Value & E - Additional Living Expense (up to 12 months)	10% of A	10% of A	N/A

Section II--Liability - All Forms

Coverage L--Personal Liability	$300,000 Each Occurrence
Coverage M--Medical Payments to Others	$5,000 Each Person

b. The amount of insurance for Coverage A, Coverage B, Coverage C, Coverage D of Section I, and Coverage L of Section II may be increased.

2. DESCRIPTION OF COVERAGES

a. Section I Coverages-Property Damage

Consult the policy for exact contract conditions.

(1) Dwelling-Coverage A, Other Structures-Coverage B, Fair Rental Value - Coverage D, and Additional Living Expense - Coverage E: Insures against all risks with certain exceptions.

(2) Personal Property Coverage C: Insures against loss caused by Named Perils such as Fire or Lightning, Windstorm or Hail, Explosion, Theft, etc., on a replacement cost basis for most items.

b. Section II Coverages--Liability--All Forms

(1) Coverage L--Personal Liability

Covers payment on behalf of an insured of all sums which an insured becomes legally obligated to pay as damages because of a covered bodily injury or property damage loss arising out of an insured's premises. If the premises is owner occupied, coverage is also provided for personal activities.

(2) Coverage M--Medical Payments to Others

Covers medical expenses incurred by persons, other than an insured, who sustain a covered bodily injury loss caused by an accident arising out of an insured's premises. If the premises is owner occupied, coverage is also provided for personal activities.

3. ELIGIBILITY

a. A Rental Property Insurance policy may be issued:

(1) Coverage A - On a dwelling building:
- (a) used solely for residential purposes (up to 5 roomers or boarders are permitted);
- (b) containing not more than 4 apartments;
- (c) which may be a townhouse or row house structure;
- (d) which may be a unit within a condominium or co-operative; or
- (e) in the course of construction.

(2) Coverage B:
- (a) on the same location as the dwelling or townhouse eligible for insurance under Coverage A;
- (b) on a structure not used for business purposes except when rented for use as a private garage; or
- (c) on a structure at a separate location when used in connection with an insured location, and not:
  - (i) rented to others;
  - (ii) capable of being used as a dwelling; or
  - (iii) used for business purposes.

b. Unit-Owners

When the policy covers a condominium or co-operative, endorsement DP-1766 - Unit-Owners Coverage will be attached.

c. Owner Occupied Dwelling

When the policy covers dwelling, townhouse, condominium or co-operative that is in whole, or part owner occupied, DP-OC Owner Occupied endorsement will be attached.

4. MANDATORY COVERAGES

Section I - It is mandatory that insurance be written for all policies covering a dwelling, townhouse, condominium or cooperative. Coverage B must be written for all policies which include Coverage A.

Section II - If Coverage L is purchased, Coverage M must be included. Coverage M cannot be purchased without Coverage L.

5. DEDUCTIBLES

Deductible Options - For Dwelling and Townhome Policies

Available All Other Perils Deductibles and Wind/Hail Deductibles:

$500 (Default)
$1,000
$2,000
$5,000
$10,000
1%
2%

Deductible Options - For Condominium and Cooperative Policies

Available All Perils Deductibles:

Coverage A Less than $50,000
$250
$500 (Default)
$1,000

Coverage A $50,000 or Greater
$250
$500 (Default)
$1,000
1%
2%

Deductible Options - Other Structures

Available All Other Perils Deductibles and Wind/Hail Deductibles:

$500

6. OPTIONAL COVERAGES

For optional Section I and II Coverages, see the Optional Coverages Section of this manual.

7. POLICY PERIOD

The Rental Property Insurance policy may be written for a period of one year and may be extended for successive policy periods by renewal certificate based upon the premiums, forms and endorsements then in effect for the Company.

8. RENEWAL PREMIUM

The continuation premium will be based upon the premiums in effect at the time of renewal. The then current editions of the applicable forms and endorsements must be made a part of the policy.

9. OTHER INSURANCE

Credit for existing insurance is not permitted.

10. CANCELLATION OR REDUCTIONS IN AMOUNTS OF INSURANCE OR COVERAGES

It is not permissible to cancel any of the mandatory coverages in the policy unless the entire policy is cancelled.

If insurance is cancelled or reduced at the request of either the insured or insurer, the earned premium will be computed on a pro rata basis.

11. MANUAL PREMIUM REVISION

A manual premium revision, meaning any revision of premium applicable to the Rental Property Insurance Program will be made in accordance with the following procedures:

a. The effective date of such revision will be as announced.

b. The revision will apply to any policy or endorsement in the manner outlined in the announcement of the revision.

c. When an existing Rental Property Insurance policy is endorsed to take advantage of a reduction in premium, the adjustment will be made on a pro rata basis.

d. Unless otherwise provided at the time the premium revision becomes effective, the premium revision does not affect in-force policy forms and endorsements until the policy is renewed.

12. RESTRICTION OF INDIVIDUAL POLICIES

If a Rental Property Insurance policy would not be issued because of unusual circumstances or exposures, the named insured may request a restriction of the policy provided no reduction in the premium is allowed.

13. SPECIAL STATE REQUIREMENTS

A Rental Property Insurance policy may be endorsed to comply with special state requirements. When required, the state Special Provisions endorsement will be attached to all Rental Property Insurance policies issued in that state.

14. ADJUSTED BUILDING COST

The Rental Property Insurance policy provides for automatic increases in the limit of liability for Coverage A at each renewal.

For condominiums, the Rental Property Insurance policy provides for automatic increases in the limit of liability for Coverage A at each renewal when the insured carries coverage in excess of the amount automatically provided with the policy.

The insured may refuse any increase at renewal, in which case, the dwelling amount will be adjusted.

15. CLASSIFICATION OF PUBLIC FIRE PROTECTION (PPC)

Public Protection Classifications are determined by using one of the following methods:

A. Using LOCATION™

(1) LOCATION™ is a database that can be used to obtain Public Protection Classifications for specific locations. LOCATION™ follows the Fire Suppression Rating Schedule and Public Protection Classification manual rules in assigning the PPC for a specific location.

(2) In the event that LOCATION™ produces a split classification (e.g., in a 6/9 – community where water source/hydrant information is not available) the classification number will be determined as follows:

(a) If the risk address is within 1000 feet of an approved water source, then the PPC is assigned the lower-numbered class (e.g., class 6 in the example above).

(b) Otherwise the risk is assigned a PPC 9.

B. Applying the following manual rules

(1) For jurisdictions listed with a single classification number, all properties within the jurisdiction should receive the listed classification number.

(2) For jurisdictions listed with multiple classification numbers (e.g. 6/9), known as a "split classification", the classification number applicable to individual properties is determined as follows:

15. CLASSIFICATION OF PUBLIC FIRE PROTECTION (PPC) (Cont'd)

(a) Split classifications shown as "X/9" or "X/8B"(e.g.6/9 or 6/8B):

i. For properties located five road miles or less from a responding fire station of a designated recognized fire department indicated in the listing for the jurisdiction, and within 1,000 feet of a fire hydrant, the first listed classification number applies. (e.g., 6/9, use class 6).

ii. For properties located five road miles or less from a responding fire station of a designated recognized fire department indicated in the listing for the jurisdiction, and with a fire hydrant more than 1,000 feet, class 9 or class 8B applies.

iii. For properties not qualifying for 2(a)i.or 2(a)ii., class 10 applies.

(b) Split classifications displayed as "X/10" where no hydrants are installed (e.g. 9/10); or where hydrant distance does not apply due to an alternate creditable water supply (e.g. 7/10):

i. For properties located within five road miles or less from a responding fire station of a designated recognized fire department indicated in the listing for the jurisdiction, the first listed classification applies (e.g., 7/10, use class 7).

ii. For properties not qualifying for 2(b)i.above, class 10 applies.

(3) For jurisdictions or areas not listed, class 10 applies.

Class 10 applies to individual properties that do not subscribe to the listed subscription fire department.

(4) Definitions

a. "Recognized Fire Department" means a fire department meeting the minimum criteria of ISO's Fire Suppression Rating Schedule (FSRS).

b. "Primary Fire Department" means the fire department that has primary overall responsibility for the jurisdiction.

16. PREMIUM DETERMINATION

1. From the rate pages, select the appropriate factors for underwriting tier, territory, protection/construction, roof type, square footage, and number of families.

2. Using the amount of insurance/deductible tables from the rate pages, determine the applicable factors for the desired deductible and amount of insurance. If the limit is not shown in the chart, use the following rules to determine the applicable factor.

   a. If the desired limit is less than the highest limit shown, use linear interpolation between the nearest limit above and below the desired limit to determine the applicable factor.

   b. If the desired limit is more than the highest limit shown, add the applicable incremental additional amount to the factor for the highest limit shown to determine the applicable factor.

3. Multiply the base rate for each peril by the appropriate factors for underwriting tier, territory, amount of insurance/deductible, protection/construction, roof type, square footage, and number of families.

4. Multiply the result by the appropriate factors for Builder's Risk, Vacancy, Increased Other Structures Limit, and Home Protector Coverage if applicable.

5. For other Optional Coverages, determine the premium by selecting the rate from the rate pages and multiplying by any applicable rating factors.

Note: Discounts and Surcharges if applicable would modify the above calculated rate.

6. A minimum premium must be charged for each policy. The applicable minimum premium is listed in the State Rate pages.

16. PREMIUM DETERMINATION (Cont'd)

7. Rate Capping

Policy renewal premium changes shall be capped. However, where applicable, if on renewal, there is no proof of fire subscription, the resulting premium adjustment shall not be capped. The capped renewal premium shall be determined as described below:

a. Calculate the full renewal premium and compare to the expiring prior term premium.

b. The premium change on the renewal policy is capped at the cap (shown on the rate pages) from the expiring prior term premium.

c. Premium adjustments to the policy other than at renewal will be capped at the same proportion as the policy’s capped to uncapped premium ratio immediately prior to the adjustment.

d. The ratio of the policy’s capped to uncapped premium shall be applied to all coverages on the policy.

e. If the difference between the full renewal premium and the expiring prior term premium does not exceed the applicable cap, the renewal premium is not capped.

17. ZIP CODE DETERMINATION

As zip codes are changed by the United States Postal Services (USPS), a new zip code may be created. This new zip code may not yet be listed in the rate manual pages. If this is the case, use the rating territory that corresponds to the zip code that formerly applied to the risk.

II. DISCOUNTS/SURCHARGES

1. Protective Device Credit

a.) Monitored Fire Alarm Credit

An approved and properly installed and maintained fire alarm in the residence may be recognized for a reduction in premium. To be eligible, the alarm must be centrally monitored by a paid service. Refer to the State Rate pages for the applicable credit.

b.) Automatic Sprinkler Credit

An approved and properly installed and maintained internal sprinkler system in the residence may be recognized for a premium credit. To be eligible, the system must be in use in the entire living area except for attics, bathrooms, closets, and any attached structures. Refer to the State Rate pages for the applicable credit.

2. Multi-Product Discount

The policy is eligible for a premium discount if the Named Insured or the spouse of the Named Insured has one of the following written by the USAA Group:

1. An active Auto policy only;
2. An active Auto policy plus an Active Homeowners and/or Renters
3. An Active Homeowners and/or Renters only;

Refer to the State Rate pages for the applicable discount.

3. Home Age Discount

All Dwelling policies are eligible for a premium discount based on the age in years of the dwelling. Refer to the State Rate pages for the applicable discount.

4. Claims Free Discount

The policy is eligible for a premium discount if no chargeable Rental Property Insurance claims have been paid for the Named Insured in the five years immediately preceding the effective date of the policy. Refer to the State Rate Pages for the applicable discount.

A claim is not considered chargeable if any of the following apply:

a. total payments on a claim are less than or equal to $500
b. a claim occurred at a location other than the property risk address
c. a claim was paid under Medical Payments to Others coverage
d. For new policies the incident resulting in a claim took place prior to October 31, 2014.
e. For renewal policies, the incident resulting in a claim took place prior to the policy's first renewal on or after January 1, 2015.
f. a claim was reported to us as catastrophe related or was weather related
g. a claim was reported to us as wildfire related

5. Claims Activity Surcharge

A premium surcharge will be applied to the policy for any chargeable Rental Property Insurance claims paid for the Named Insured in the three years immediately preceding the effective date of the policy. Refer to the State Rate Pages for the applicable surcharge.

A claim is not considered chargeable if any of the following apply:

a. total payments on a claim are less than or equal to $500
b. a claim that occurred at a location other than the policy risk address
c. a claim was paid under Medical Payments to Others coverage
d. For new policies the incident resulting in a claim took place prior to October 31, 2014.
e. For renewal policies, the incident resulting in a claim took place prior to the policy's first renewal on or after January 1, 2015.
f. a claim was reported to us as catastrophe related or was weather related
g. a claim was reported to us as wildfire related

III. OPTIONAL COVERAGES

1. Home Protector - Form DP-3

Form DP-3 may be endorsed to provide an additional percentage of the Coverage A limit to apply to a covered loss when:

(1) the limit of liability applying to a building covered under Coverages A or B is exhausted:
(2) the limit of liability provided under Additional Coverages, Debris Removal is exhausted;
(3) the limit of liability provided under Additional Coverages, Building Ordinance is exhausted.

The most that will be paid for (1), (2) or (3), either singly or in any combination is 25% of Coverage A.

A. Eligibility

A dwelling is used principally for private residential purposes. The dwelling may not be a mobile home.

B. Rules

1. The dwelling must be insured for 100% of value at the time this endorsement is applied. The value is to be determined by one of this Company's accepted methods for determining value.

2. The insured must annually accept any applicable adjusted building cost increase.

3. To maintain the replacement cost provisions, the insured must notify the Company of any additions or other physical changes which change the value of either the dwelling or other structures on the residence premises by 25,000 OR 5% which ever is greater.

C. Rates

1. When the DP-3 policy is endorsed with Home Protector, the additional percentage of coverage will be 25%. See State Rate pages for applicable charge.

   Use Endorsement DP-125 Home Protector Coverage

2. Optional Limits for Other Structures

When Coverage A is written, Coverage B - Other Structures, may be increased above the contract limit of 10%. The following optional percentage of Coverage A limits are available:

15%, 25%, 50%, 75% and 100%. See State Rate pages.

3. Vacancy/Unoccupied

When the dwelling is vacant or unoccupied a surcharge will apply and the DP-VAC- Amendment to Glass or Vandalism Coverage will be added.

A dwelling is vacant if it is unoccupied and contains no furniture. A dwelling is unoccupied when no one resides there at the time of loss and there is not a lease on the property.

4. Earthquake Coverage

A. When added to the Rental Property policy, this peril shall apply to the same coverages and for the same limits that apply to the peril of Fire.

Use Endorsement DP-370 Earthquake Coverage.

B. Deductible

A base deductible of 10% applies. The deductible will be a percentage of Coverage A, Coverage B, or Coverage C, whichever is higher.

C. Premium for Base Deductible

Develop the premium as follows:

1. From the state rate pages:
   a. Determine the Earthquake Zone
   b. Determine if Rate Table A, and/or B applies
   c. Select the rate according to construction from the Rate Table; and

2. Multiply the rate determined above by the amounts of insurance for:
   a. Coverages A, B, C, D, & E
   b. Improvements, Alterations and Additions - Increased Limits
   c. Other Building Coverage options
   d. Other Personal Property Coverage

Zone Definition

Zone 2: Clay, Craighead, Crittenden, Cross, Greene, Jackson, Mississippi, Poinsett
Zone 3: Independence, Lawrence, Lee, Monroe, Phillips, Randolph, St. Francis, Woodruff, White
Zone 4: Arkansas, Baxter, Cleburne, Conway, Desha, Faulkner, Fulton, Izard, Jefferson, Little River, Lonoke, Marion, Prairie, Pulaski, Searcy, Sebastian, Sharp, Stone, Van Buren
Zone 5: Remainder of State

5. Dwelling Under Construction - Builders Risk

The policy may be endorsed with a Dwelling Under Construction - Builders Risk endorsement to provide coverage for loss caused by theft of materials and supplies that will become a part of the dwelling or other structure. This coverage applies when the building is eligible for Coverage A or Coverage B and the intended occupancy will be primary, secondary, or rental residence. Materials and supplies which will be used in the construction of the dwelling or other structure are covered up to $5,000 while at any other location within the United States or while in due course of transit.

The Coverage A limit shall be based on the contractor's estimate of the value of the dwelling upon completion.

The premium for a policy endorsed with Dwelling Under Construction - Builders Risk endorsement is determined by applying a factor to the premium for the Coverage A limit. See State Rate pages for the factor.

Use Endorsement DP-UC Dwelling Under Construction - Builders Risk.

6. Water Backup or Sump Pump Overflow - All Dwelling and Unit-owners policies.

The policy may be endorsed to provide $10,000 coverage for loss caused by water which backs up through sewers or drains or which overflows from a sump pump or sump well. The policy deductible applies to any loss covered by this endorsement. See State Rate pages.

Use Endorsement DP-208 Water Backup or Sump Pump Overflow

7. Fair Rental Value

When Coverage A is included on the policy, Fair Rental Value may be increased above the contract limit of 10% of Coverage A. When the amount is increased it will be shown on the DP-FRV Increased Fair Rental Value endorsement. See State Rate pages.

IV. SECTION II-LIMITS OF LIABILITY AND OTHER EXPOSURES

Basic limits of $300,000 for Coverage L (Personal Liability) and $5000 for Coverage M (Medical Payments to Others) are provided in the policy. When the Coverage L limit is increased see State Rate Pages.

Coverage L limits apply on an "occurrence" basis; Coverage M limits, on an "each person" basis.

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Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

BASE RATES AND MINIMUM PREMIUMS

BASE RATES

		Non-Catastrophe				Fire Following		Medical
Structure Type	Company/Covg	Fire	EC	Broad	Special	Earthquake	Liability*	Payments**
DWELLING	USAA Covg A	**1325.06**	**1031.07**	**--**	**268.43**	**3.62**	**33.61**	**8.62**
	USAA Covg C	**24.82**	**29.69**	**4.84**	**--**	**0.00**	**--**	**--**
	USAA-CIC Covg A	**1762.87**	**1440.49**	**--**	**372.47**	**3.62**	**33.61**	**8.62**
	USAA-CIC Covg C	**38.46**	**44.18**	**7.07**	**--**	**0.00**	**--**	**--**
	USAA-GIC Covg A	**1762.87**	**1440.49**	**--**	**372.47**	**3.62**	**33.61**	**8.62**
	USAA-GIC Covg C	**38.46**	**44.18**	**7.07**	**--**	**0.00**	**--**	**--**
	Garrison Covg A	**1762.87**	**1440.49**	**--**	**372.47**	**3.62**	**33.61**	**8.62**
	Garrison Covg C	**38.46**	**44.18**	**7.07**	**--**	**0.00**	**--**	**--**

		Non-Catastrophe				Fire Following		Medical
Structure Type	Company/Covg	Fire	EC	Broad	Special	Earthquake	Liability**	Payments***
CONDO	USAA Covg A	**515.01**	**410.78**	**--**	**88.44**	**1.33**	**29.34**	**7.53**
	USAA Covg C	**25.43**	**33.86**	**4.82**	**--**	**0.00**	**--**	**--**
	USAA-CIC Covg A	**614.06**	**478.55**	**--**	**101.12**	**1.33**	**29.34**	**7.53**
	USAA-CIC Covg C	**33.48**	**39.60**	**4.94**	**--**	**0.00**	**--**	**--**
	USAA-GIC Covg A	**614.06**	**478.55**	**--**	**101.12**	**1.33**	**29.34**	**7.53**
	USAA-GIC Covg C	**33.48**	**39.60**	**4.94**	**--**	**0.00**	**--**	**--**
	Garrison Covg A	**614.06**	**478.55**	**--**	**101.12**	**1.33**	**29.34**	**7.53**
	Garrison Covg C	**33.48**	**39.60**	**4.94**	**--**	**0.00**	**--**	**--**

		Non-Catastrophe				Fire Following		Medical
Structure Type	Company	Fire	EC	Broad***	Special***	Earthquake	Liability**	Payments***
MISCELLANEOUS	USAA	**301.39**	**295.44**	**--**	**62.79**	**1.32**	**19.50**	**5.00**
	CIC	**301.39**	**295.44**	**--**	**62.79**	**1.32**	**19.50**	**5.00**
	GIC	**301.39**	**295.44**	**--**	**62.79**	**1.32**	**19.50**	**5.00**
	Garrison	**301.39**	**295.44**	**--**	**62.79**	**1.32**	**19.50**	**5.00**

* Liability is an optional coverage
** Medical Payments is an optional coverage
*** Special base rate for Miscellaneous structure type is used for both Broad and Special coverage

MINIMUM PREMIUMS

Structure Type	USAA	USAA-CIC	USAA-GIC	Garrison
DWELLING	**$250**	**$250**	**$250**	**$250**
CONDO	**$125**	**$125**	**$125**	**$125**
MISCELLANEOUS	**$50**	**$50**	**$50**	**$50**

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TIER FACTORS

USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Tier	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
21	0.3016	0.5250	0.3692	0.3692	1.0000	0.4255
22	0.3169	0.5406	0.3886	0.3886	1.0000	0.4488
23	0.3330	0.5566	0.4084	0.4084	1.0000	0.4722
24	0.3497	0.5729	0.4285	0.4285	1.0000	0.4953
25	0.3672	0.5896	0.4489	0.4489	1.0000	0.5182
26	0.3854	0.6068	0.4696	0.4696	1.0000	0.5409
27	0.4045	0.6249	0.4906	0.4906	1.0000	0.5632
28	0.4244	0.6405	0.5119	0.5119	1.0000	0.5853
29	0.4453	0.6566	0.5335	0.5335	1.0000	0.6070
30	0.4671	0.6730	0.5555	0.5555	1.0000	0.6284
31	0.4898	0.6898	0.5778	0.5778	1.0000	0.6496
32	0.5136	0.7069	0.6005	0.6005	1.0000	0.6706
33	0.5385	0.7243	0.6237	0.6237	1.0000	0.6915
34	0.5646	0.7422	0.6474	0.6474	1.0000	0.7122
35	0.5920	0.7604	0.6717	0.6717	1.0000	0.7329
36	0.6206	0.7789	0.6965	0.6965	1.0000	0.7538
37	0.6506	0.7979	0.7222	0.7222	1.0000	0.7749
38	0.6821	0.8173	0.7485	0.7485	1.0000	0.7963
39	0.7151	0.8371	0.7758	0.7758	1.0000	0.8183
40	0.7499	0.8574	0.8040	0.8040	1.0000	0.8409
41	0.7864	0.8780	0.8333	0.8333	1.0000	0.8642
42	0.8248	0.8992	0.8638	0.8638	1.0000	0.8886
43	0.8652	0.9201	0.8955	0.8955	1.0000	0.9141
44	0.9078	0.9461	0.9288	0.9288	1.0000	0.9410
45	0.9526	0.9727	0.9635	0.9635	1.0000	0.9696
46	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
47	1.0499	1.0280	1.0384	1.0384	1.0000	1.0326
48	1.1028	1.0568	1.0789	1.0789	1.0000	1.0678
49	1.1586	1.0863	1.1215	1.1215	1.0000	1.1058
50	1.2176	1.1165	1.1668	1.1668	1.0000	1.1471
51	1.2801	1.1477	1.2149	1.2149	1.0000	1.1922
52	1.3463	1.1798	1.2660	1.2660	1.0000	1.2417
53	1.4164	1.2127	1.3205	1.3205	1.0000	1.2962
54	1.4909	1.2466	1.3789	1.3789	1.0000	1.3563
55	1.5699	1.2815	1.4415	1.4415	1.0000	1.4231
56	1.6538	1.3176	1.5089	1.5089	1.0000	1.4976
57	1.7431	1.3548	1.5818	1.5818	1.0000	1.5809
58	1.8380	1.3931	1.6608	1.6608	1.0000	1.6746

* Liability and Medical Payments are optional coverages

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TERRITORY FACTORS

USAA GROUP
ALL STRUCTURE TYPES
COVERAGE A, B, and C

Territory	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
ALL	1.0000	1.0000	1.0000	1.0000	**1.0000**	**1.0000**

* Liability and Medical Payments are optional coverages

State: ARKANSAS
Line of Business: RENTAL PROPERTY INSURANCE
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USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Fire (Non-Catastrophe)

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**0.0948**	**0.0815**	**0.0664**	**0.0521**	**0.0393**	**0.1138**	**0.1100**
$50,000	**0.4250**	**0.3652**	**0.2975**	**0.2338**	**0.1762**	**0.4250**	**0.3652**
$100,000	**0.6491**	**0.5577**	**0.4544**	**0.3570**	**0.2691**	**0.5577**	**0.4544**
$125,000	**0.7394**	**0.6353**	**0.5176**	**0.4067**	**0.3066**	**0.6006**	**0.4952**
$150,000	**0.8297**	**0.7129**	**0.5808**	**0.4563**	**0.3440**	**0.6435**	**0.5359**
$175,000	**0.9149**	**0.7861**	**0.6404**	**0.5032**	**0.3793**	**0.6718**	**0.5660**
$200,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7000**	**0.5960**
$225,000	**1.0918**	**0.9381**	**0.7643**	**0.6005**	**0.4527**	**0.7458**	**0.6170**
$250,000	**1.1837**	**1.0170**	**0.8286**	**0.6380**	**0.4907**	**0.7916**	**0.6380**
$275,000	**1.2755**	**1.0959**	**0.8928**	**0.7015**	**0.5288**	**0.8374**	**0.6590**
$300,000	**1.3673**	**1.1748**	**0.9571**	**0.7520**	**0.5668**	**0.8832**	**0.6800**
$400,000	**1.7429**	**1.4975**	**1.2200**	**0.9586**	**0.7225**	**1.0200**	**0.7500**
$500,000	**2.0392**	**1.7520**	**1.4274**	**1.1216**	**0.8454**	**1.1216**	**0.8454**
$750,000	**2.7121**	**2.3302**	**1.8985**	**1.4917**	**1.1243**	**1.2950**	**0.9713**
$1,000,000	**3.3901**	**2.9127**	**2.3731**	**1.8646**	**1.4054**	**1.4054**	**1.0541**
$1,500,000	**4.5089**	**3.8740**	**3.1562**	**2.4799**	**1.8692**	**1.6823**	**1.2617**
$2,000,000	**5.6361**	**4.8424**	**3.9453**	**3.0999**	**2.3365**	**1.9860**	**1.4895**
for each add'l $10,000 above $2,000,000, add:	**0.0225**	**0.0194**	**0.0158**	**0.0124**	**0.0093**	**0.0061**	**0.0046**

* This is the Coverage A (Dwelling) limit on the policy

State: ARKANSAS
Line of Business: RENTAL PROPERTY INSURANCE
Effective: OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: UNITED SERVICES AUTOMOBILE ASSOCIATION
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

EC (Non-Catastrophe)

	Wind/Hail Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**0.1037**	**0.0895**	**0.0726**	**0.0571**	**0.0436**	**0.1178**	**0.1140**
$50,000	**0.4913**	**0.4237**	**0.3439**	**0.2702**	**0.2064**	**0.4913**	**0.4237**
$100,000	**0.7016**	**0.6050**	**0.4911**	**0.3859**	**0.2947**	**0.6050**	**0.4911**
$125,000	**0.7824**	**0.6747**	**0.5477**	**0.4304**	**0.3286**	**0.6275**	**0.5106**
$150,000	**0.8632**	**0.7443**	**0.6042**	**0.4748**	**0.3625**	**0.6500**	**0.5300**
$175,000	**0.9316**	**0.8033**	**0.6521**	**0.5124**	**0.3913**	**0.6750**	**0.5550**
$200,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.7000**	**0.5800**
$225,000	**1.0575**	**0.9119**	**0.7403**	**0.5816**	**0.4442**	**0.7175**	**0.5900**
$250,000	**1.1150**	**0.9615**	**0.7805**	**0.6000**	**0.4683**	**0.7350**	**0.6000**
$275,000	**1.1725**	**1.0110**	**0.8208**	**0.6449**	**0.4925**	**0.7525**	**0.6100**
$300,000	**1.2300**	**1.0606**	**0.8610**	**0.6765**	**0.5166**	**0.7700**	**0.6200**
$400,000	**1.4250**	**1.2287**	**0.9975**	**0.7837**	**0.5985**	**0.8200**	**0.6455**
$500,000	**1.5973**	**1.3773**	**1.1181**	**0.8785**	**0.6709**	**0.8785**	**0.6709**
$750,000	**1.9633**	**1.6929**	**1.3743**	**1.0798**	**0.8246**	**0.9149**	**0.7200**
$1,000,000	**2.2648**	**1.9530**	**1.5854**	**1.2457**	**0.9512**	**0.9512**	**0.7610**
$1,500,000	**2.8679**	**2.4730**	**2.0075**	**1.5773**	**1.2045**	**1.0841**	**0.8672**
$2,000,000	**3.4710**	**2.9930**	**2.4297**	**1.9090**	**1.4578**	**1.2467**	**0.9973**
for each add'l $10,000 above $2,000,000, add:	**0.0121**	**0.0104**	**0.0084**	**0.0066**	**0.0051**	**0.0033**	**0.0026**

* This is the Coverage A (Dwelling) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Special (Non-Catastrophe)

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**0.0775**	**0.0666**	**0.0543**	**0.0426**	**0.0321**	**0.0930**	**0.0899**
$50,000	**0.3750**	**0.3222**	**0.2625**	**0.2062**	**0.1555**	**0.3750**	**0.3222**
$100,000	**0.6127**	**0.5264**	**0.4289**	**0.3370**	**0.2540**	**0.5264**	**0.4289**
$125,000	**0.7144**	**0.6138**	**0.5001**	**0.3929**	**0.2962**	**0.5797**	**0.4780**
$150,000	**0.8160**	**0.7011**	**0.5712**	**0.4488**	**0.3383**	**0.6329**	**0.5271**
$175,000	**0.9080**	**0.7802**	**0.6356**	**0.4994**	**0.3765**	**0.6665**	**0.5616**
$200,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7000**	**0.5960**
$225,000	**1.0828**	**0.9304**	**0.7580**	**0.5956**	**0.4489**	**0.7400**	**0.6200**
$250,000	**1.1656**	**1.0015**	**0.8160**	**0.6440**	**0.4833**	**0.7800**	**0.6440**
$275,000	**1.2484**	**1.0727**	**0.8739**	**0.6867**	**0.5176**	**0.8199**	**0.6679**
$300,000	**1.3312**	**1.1438**	**0.9319**	**0.7322**	**0.5519**	**0.8599**	**0.6919**
$400,000	**1.6314**	**1.4017**	**1.1420**	**0.8973**	**0.6763**	**0.9724**	**0.7573**
$500,000	**1.9102**	**1.6412**	**1.3371**	**1.0506**	**0.7919**	**1.0506**	**0.7919**
$750,000	**2.4000**	**2.0620**	**1.6800**	**1.3200**	**0.9949**	**1.1460**	**0.8744**
$1,000,000	**3.1035**	**2.6664**	**2.1724**	**1.7069**	**1.2866**	**1.2866**	**0.9749**
$1,500,000	**4.2277**	**3.6324**	**2.9594**	**2.3252**	**1.7526**	**1.5404**	**1.1553**
$2,000,000	**5.3520**	**4.5983**	**3.7464**	**2.9436**	**2.2187**	**1.6813**	**1.2610**

for each add'l $10,000 above $2,000,000, add:

	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
	0.0225	**0.0193**	**0.0157**	**0.0124**	**0.0093**	**0.0028**	**0.0021**

* This is the Coverage A (Dwelling) limit on the policy

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

State: ARKANSAS
Line of Business: RENTAL PROPERTY INSURANCE
Effective: OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: UNITED SERVICES AUTOMOBILE ASSOCIATION
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Fire Following Earthquake

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**0.1200**	**0.1147**	**0.1084**	**0.1002**	**0.0866**	**0.1256**	**0.1241**
$50,000	**0.3732**	**0.3568**	**0.3371**	**0.3117**	**0.2693**	**0.3732**	**0.3568**
$100,000	**0.6308**	**0.6029**	**0.5698**	**0.5268**	**0.4552**	**0.6029**	**0.5698**
$125,000	**0.7242**	**0.6922**	**0.6541**	**0.6048**	**0.5226**	**0.6813**	**0.6446**
$150,000	**0.8175**	**0.7814**	**0.7384**	**0.6827**	**0.5899**	**0.7596**	**0.7194**
$175,000	**0.9088**	**0.8686**	**0.8208**	**0.7589**	**0.6558**	**0.8314**	**0.7883**
$200,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9032**	**0.8572**
$225,000	**1.0875**	**1.0395**	**0.9823**	**0.9082**	**0.7848**	**0.9744**	**0.9167**
$250,000	**1.1750**	**1.1231**	**1.0613**	**0.9761**	**0.8479**	**1.0456**	**0.9761**
$275,000	**1.2625**	**1.2068**	**1.1404**	**1.0543**	**0.9111**	**1.1167**	**1.0356**
$300,000	**1.3500**	**1.2904**	**1.2194**	**1.1274**	**0.9742**	**1.1879**	**1.0950**
$400,000	**1.6200**	**1.5484**	**1.4632**	**1.3529**	**1.1690**	**1.3887**	**1.2394**
$500,000	**1.8630**	**1.7807**	**1.6827**	**1.5558**	**1.3444**	**1.5558**	**1.3444**
$750,000	**2.4778**	**2.3683**	**2.2380**	**2.0693**	**1.7880**	**1.9235**	**1.6350**
$1,000,000	**3.0972**	**2.9604**	**2.7975**	**2.5866**	**2.2350**	**2.2350**	**1.8551**
$1,500,000	**4.1193**	**3.9374**	**3.7207**	**3.4401**	**2.9726**	**2.5267**	**2.0719**
$2,000,000	**5.1492**	**4.9217**	**4.6508**	**4.3002**	**3.7157**	**3.0469**	**2.4375**
for each add'l $10,000 above $2,000,000, add:	**0.0206**	**0.0197**	**0.0186**	**0.0172**	**0.0149**	**0.0104**	**0.0073**

* This is the Coverage A (Dwelling) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

State: ARKANSAS
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Liability / Medical Payments*

	All Other Perils Deductible						
Amount of Insurance**	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**0.6923**	**0.6923**	**0.6923**	**0.6923**	**0.6923**	**0.6923**	**0.6923**
$50,000	**0.7556**	**0.7556**	**0.7556**	**0.7556**	**0.7556**	**0.7556**	**0.7556**
$100,000	**0.8348**	**0.8348**	**0.8348**	**0.8348**	**0.8348**	**0.8348**	**0.8348**
$125,000	**0.8751**	**0.8751**	**0.8751**	**0.8751**	**0.8751**	**0.8751**	**0.8751**
$150,000	**0.9161**	**0.9161**	**0.9161**	**0.9161**	**0.9161**	**0.9161**	**0.9161**
$175,000	**0.9578**	**0.9578**	**0.9578**	**0.9578**	**0.9578**	**0.9578**	**0.9578**
$200,000	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
$225,000	**1.0426**	**1.0426**	**1.0426**	**1.0426**	**1.0426**	**1.0426**	**1.0426**
$250,000	**1.0856**	**1.0856**	**1.0856**	**1.0856**	**1.0856**	**1.0856**	**1.0856**
$275,000	**1.1289**	**1.1289**	**1.1289**	**1.1289**	**1.1289**	**1.1289**	**1.1289**
$300,000	**1.1724**	**1.1724**	**1.1724**	**1.1724**	**1.1724**	**1.1724**	**1.1724**
$400,000	**1.3463**	**1.3463**	**1.3463**	**1.3463**	**1.3463**	**1.3463**	**1.3463**
$500,000	**1.5163**	**1.5163**	**1.5163**	**1.5163**	**1.5163**	**1.5163**	**1.5163**
$750,000	**1.8925**	**1.8925**	**1.8925**	**1.8925**	**1.8925**	**1.8925**	**1.8925**
$1,000,000	**2.1721**	**2.1721**	**2.1721**	**2.1721**	**2.1721**	**2.1721**	**2.1721**
$1,500,000	**2.7279**	**2.7279**	**2.7279**	**2.7279**	**2.7279**	**2.7279**	**2.7279**
$2,000,000	**3.4644**	**3.4644**	**3.4644**	**3.4644**	**3.4644**	**3.4644**	**3.4644**
for each add'l $10,000 above $2,000,000, add:	**0.0147**	**0.0147**	**0.0147**	**0.0147**	**0.0147**	**0.0147**	**0.0147**

* Liability and Medical Payments are optional coverages
** This is the Coverage A (Dwelling) limit on the policy

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Water Backup/Sump Pump Overflow*

	All Other Perils Deductible						
Amount of Insurance**	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**1.0384**	**1.0289**
$50,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**1.0000**	**0.9500**
$100,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.9500**	**0.8250**
$125,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.9145**	**0.7670**
$150,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.8845**	**0.7111**
$175,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.8546**	**0.6574**
$200,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.8250**	**0.6059**
$225,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.7958**	**0.5568**
$250,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.7670**	**0.5000**
$275,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.7387**	**0.4657**
$300,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.7111**	**0.4238**
$400,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.6059**	**0.2782**
$500,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.5000**	**0.1500**
$750,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.3116**	**0.1000**
$1,000,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.1500**	**0.0750**
$1,500,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.1000**	**0.0500**
$2,000,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.0750**	**0.0375**
for each add'l $10,000 above $2,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

* Water Backup/Sump Pump Overflow is an optional coverage
** This is the Coverage A (Dwelling) limit on the policy

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Fire (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**0.0763**	**0.0669**	**0.0575**	**0.1078**	**0.0937**
$5,000	**0.1272**	**0.1115**	**0.0959**	**0.1540**	**0.1339**
$10,000	**0.2544**	**0.2231**	**0.1918**	**0.2678**	**0.2588**
$15,000	**0.3774**	**0.3311**	**0.2845**	**0.3906**	**0.3678**
$20,000	**0.4981**	**0.4367**	**0.3753**	**0.5066**	**0.4602**
$30,000	**0.7327**	**0.6424**	**0.5518**	**0.7136**	**0.6231**
$40,000	**0.9593**	**0.8409**	**0.7226**	**0.8866**	**0.7678**
$50,000	**1.1407**	**1.0000**	**0.8593**	**1.0000**	**0.8593**
$60,000	**1.2709**	**1.1142**	**0.9574**	**1.0766**	**0.9144**
$75,000	**1.4661**	**1.2854**	**1.1045**	**1.1915**	**0.9969**
$100,000	**1.7421**	**1.5273**	**1.3122**	**1.3122**	**1.0692**
$125,000	**1.9845**	**1.7398**	**1.4948**	**1.4132**	**1.1651**
$150,000	**2.2268**	**1.9522**	**1.6774**	**1.5141**	**1.2609**
$200,000	**2.6838**	**2.3529**	**2.0216**	**1.6471**	**1.4024**
$300,000	**3.6696**	**3.2172**	**2.7642**	**2.0781**	**1.6000**
$500,000	**5.4729**	**4.7981**	**4.1224**	**2.6391**	**1.9892**
$1,000,000	**9.0986**	**7.9767**	**6.8534**	**3.3068**	**2.4801**

for each add'l $10,000 above $1,000,000, add:	**0.0725**	**0.0636**	**0.0546**	**0.0134**	**0.0098**

* This is the Coverage A (Building Items) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

EC (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**0.0685**	**0.0633**	**0.0547**	**0.0965**	**0.0839**
$5,000	**0.1142**	**0.1055**	**0.0911**	**0.1379**	**0.1199**
$10,000	**0.2284**	**0.2111**	**0.1822**	**0.2398**	**0.2320**
$15,000	**0.3426**	**0.3167**	**0.2732**	**0.3540**	**0.3373**
$20,000	**0.4567**	**0.4223**	**0.3641**	**0.4643**	**0.4358**
$30,000	**0.6853**	**0.6334**	**0.5463**	**0.6745**	**0.6149**
$40,000	**0.9137**	**0.8445**	**0.7283**	**0.8716**	**0.7726**
$50,000	**1.0818**	**1.0000**	**0.8624**	**1.0000**	**0.8624**
$60,000	**1.1825**	**1.0931**	**0.9427**	**1.0579**	**0.8898**
$75,000	**1.3336**	**1.2329**	**1.0631**	**1.1447**	**0.9310**
$100,000	**1.5447**	**1.4280**	**1.2314**	**1.2314**	**0.9996**
$125,000	**1.7227**	**1.5925**	**1.3732**	**1.2772**	**1.0392**
$150,000	**1.9007**	**1.7570**	**1.5150**	**1.3230**	**1.0788**
$200,000	**2.2019**	**2.0354**	**1.7551**	**1.4248**	**1.1805**
$300,000	**2.7083**	**2.5036**	**2.1588**	**1.5673**	**1.2620**
$500,000	**3.5170**	**3.2512**	**2.8034**	**1.7881**	**1.3656**
$1,000,000	**4.9868**	**4.6098**	**3.9752**	**1.9361**	**1.5489**

for each add'l $10,000 above $1,000,000, add:					
	0.0294	**0.0272**	**0.0234**	**0.0034**	**0.0033**

* This is the Coverage A (Building Items) limit on the policy

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State: ARKANSAS
Line of Business: RENTAL PROPERTY INSURANCE
Effective: OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: UNITED SERVICES AUTOMOBILE ASSOCIATION
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Special (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**0.0707**	**0.0620**	**0.0533**	**0.0998**	**0.0868**
$5,000	**0.1179**	**0.1033**	**0.0888**	**0.1426**	**0.1240**
$10,000	**0.2357**	**0.2067**	**0.1776**	**0.2480**	**0.2397**
$15,000	**0.3536**	**0.3101**	**0.2664**	**0.3659**	**0.3445**
$20,000	**0.4717**	**0.4133**	**0.3552**	**0.4797**	**0.4357**
$30,000	**0.7075**	**0.6203**	**0.5328**	**0.6891**	**0.6016**
$40,000	**0.9432**	**0.8269**	**0.7104**	**0.8717**	**0.7549**
$50,000	**1.1405**	**1.0000**	**0.8592**	**1.0000**	**0.8592**
$60,000	**1.2927**	**1.1334**	**0.9739**	**1.0944**	**0.9292**
$75,000	**1.5211**	**1.3336**	**1.1459**	**1.2360**	**1.0341**
$100,000	**1.8637**	**1.6339**	**1.4037**	**1.4037**	**1.1437**
$125,000	**2.1729**	**1.9049**	**1.6367**	**1.5457**	**1.2747**
$150,000	**2.4821**	**2.1760**	**1.8696**	**1.6877**	**1.4056**
$200,000	**3.0416**	**2.6667**	**2.2912**	**1.8667**	**1.5893**
$300,000	**4.0493**	**3.5499**	**3.0501**	**2.2931**	**1.8451**
$500,000	**5.8104**	**5.0939**	**4.3765**	**2.8016**	**2.1117**
$1,000,000	**9.4397**	**8.2760**	**7.1104**	**3.4309**	**2.5997**

for each add'l $10,000 above $1,000,000, add:	**0.0726**	**0.0636**	**0.0547**	**0.0126**	**0.0098**

* This is the Coverage A (Building Items) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)** **JANUARY 1, 2015 (RENEWAL BUSINESS)**
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION** **USAA CASUALTY INSURANCE COMPANY** **USAA GENERAL INDEMNITY COMPANY** **GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY**

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State: ARKANSAS
Line of Business: RENTAL PROPERTY INSURANCE
Effective: OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: UNITED SERVICES AUTOMOBILE ASSOCIATION
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Fire Following Earthquake

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**0.0992**	**0.0965**	**0.0922**	**0.1355**	**0.1178**
$5,000	**0.1653**	**0.1608**	**0.1537**	**0.1935**	**0.1683**
$10,000	**0.3307**	**0.3215**	**0.3073**	**0.3365**	**0.3325**
$15,000	**0.4290**	**0.4175**	**0.3990**	**0.4344**	**0.4268**
$20,000	**0.5086**	**0.4949**	**0.4729**	**0.5118**	**0.5003**
$30,000	**0.7028**	**0.6835**	**0.6533**	**0.6988**	**0.6774**
$40,000	**0.8746**	**0.8508**	**0.8130**	**0.8601**	**0.8280**
$50,000	**1.0281**	**1.0000**	**0.9561**	**1.0000**	**0.9561**
$60,000	**1.1618**	**1.1300**	**1.0803**	**1.1182**	**1.0661**
$75,000	**1.3623**	**1.3250**	**1.2666**	**1.2956**	**1.2312**
$100,000	**1.7377**	**1.6902**	**1.6155**	**1.6155**	**1.5268**
$125,000	**1.9948**	**1.9404**	**1.8546**	**1.8254**	**1.7272**
$150,000	**2.2519**	**2.1905**	**2.0938**	**2.0354**	**1.9277**
$200,000	**2.7546**	**2.6795**	**2.5611**	**2.4202**	**2.2969**
$300,000	**3.7189**	**3.6174**	**3.4577**	**3.1830**	**2.9341**
$500,000	**5.1318**	**4.9920**	**4.7714**	**4.1688**	**3.6024**
$1,000,000	**8.5319**	**8.2990**	**7.9325**	**5.9887**	**4.9707**

for each add'l $10,000 above $1,000,000, add:	**0.0680**	**0.0661**	**0.0632**	**0.0364**	**0.0274**

* This is the Coverage A (Building Items) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Liability / Medical Payments*

	All Perils Deductible				
Amount of Insurance**	$250	$500	$1,000	1%	2%
$3,000	**0.8980**	**0.8980**	**0.8980**	**0.8980**	**0.8980**
$5,000	**0.9071**	**0.9071**	**0.9071**	**0.9071**	**0.9071**
$10,000	**0.9162**	**0.9162**	**0.9162**	**0.9162**	**0.9162**
$15,000	**0.9267**	**0.9267**	**0.9267**	**0.9267**	**0.9267**
$20,000	**0.9372**	**0.9372**	**0.9372**	**0.9372**	**0.9372**
$30,000	**0.9581**	**0.9581**	**0.9581**	**0.9581**	**0.9581**
$40,000	**0.9791**	**0.9791**	**0.9791**	**0.9791**	**0.9791**
$50,000	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
$60,000	**1.0210**	**1.0210**	**1.0210**	**1.0210**	**1.0210**
$75,000	**1.0524**	**1.0524**	**1.0524**	**1.0524**	**1.0524**
$100,000	**1.1048**	**1.1048**	**1.1048**	**1.1048**	**1.1048**
$125,000	**1.1582**	**1.1582**	**1.1582**	**1.1582**	**1.1582**
$150,000	**1.2124**	**1.2124**	**1.2124**	**1.2124**	**1.2124**
$200,000	**1.3235**	**1.3235**	**1.3235**	**1.3235**	**1.3235**
$300,000	**1.5516**	**1.5516**	**1.5516**	**1.5516**	**1.5516**
$500,000	**2.0067**	**2.0067**	**2.0067**	**2.0067**	**2.0067**
$1,000,000	**2.8747**	**2.8747**	**2.8747**	**2.8747**	**2.8747**
for each add'l $10,000 above $1,000,000, add:	**0.0174**	**0.0174**	**0.0174**	**0.0174**	**0.0174**

* Liability and Medical Payments are optional coverages
** This is the Coverage A (Building Items) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Water Backup/Sump Pump Overflow*

	All Perils Deductible				
Amount of Insurance**	$250	$500	$1,000	1%	2%
$3,000	**1.0250**	**1.0000**	**0.9500**	**1.0450**	**1.0422**
$5,000	**1.0250**	**1.0000**	**0.9500**	**1.0432**	**1.0384**
$10,000	**1.0250**	**1.0000**	**0.9500**	**1.0384**	**1.0289**
$15,000	**1.0250**	**1.0000**	**0.9500**	**1.0336**	**1.0192**
$20,000	**1.0250**	**1.0000**	**0.9500**	**1.0289**	**1.0096**
$30,000	**1.0250**	**1.0000**	**0.9500**	**1.0192**	**0.9900**
$40,000	**1.0250**	**1.0000**	**0.9500**	**1.0096**	**0.9697**
$50,000	**1.0250**	**1.0000**	**0.9500**	**1.0000**	**0.9500**
$60,000	**1.0250**	**1.0000**	**0.9500**	**0.9900**	**0.9250**
$75,000	**1.0250**	**1.0000**	**0.9500**	**0.9750**	**0.8845**
$100,000	**1.0250**	**1.0000**	**0.9500**	**0.9500**	**0.8250**
$125,000	**1.0250**	**1.0000**	**0.9500**	**0.9145**	**0.7670**
$150,000	**1.0250**	**1.0000**	**0.9500**	**0.8845**	**0.7111**
$200,000	**1.0250**	**1.0000**	**0.9500**	**0.8250**	**0.6059**
$300,000	**1.0250**	**1.0000**	**0.9500**	**0.7111**	**0.4238**
$500,000	**1.0250**	**1.0000**	**0.9500**	**0.5000**	**0.1500**
$1,000,000	**1.0250**	**1.0000**	**0.9500**	**0.1500**	**0.0750**
for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

* Water Backup/Sump Pump Overflow is an optional coverage
** This is the Coverage A (Building Items) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

Fire (Non-Catastrophe)

Amount of Insurance*	All Perils Deductible $500
$1,000	**0.0200**
$3,000	**0.0600**
$5,000	**0.1000**
$10,000	**0.2000**
$15,000	**0.3000**
$20,000	**0.4000**
$30,000	**0.6000**
$40,000	**0.8000**
$50,000	**1.0000**
$75,000	**1.5000**
$100,000	**2.0000**
$125,000	**2.5000**
$150,000	**3.0000**
$200,000	**4.0000**
$300,000	**6.0000**
$500,000	**10.0000**
$1,000,000	**20.0000**

for each add'l $10,000 above $1,000,000, add: **0.2000**

* This is the Total Coverage (B & C) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

EC (Non-Catastrophe)

	All Perils Deductible
Amount of Insurance*	$500
$1,000	**0.0200**
$3,000	**0.0600**
$5,000	**0.1000**
$10,000	**0.2000**
$15,000	**0.3000**
$20,000	**0.4000**
$30,000	**0.6000**
$40,000	**0.8000**
$50,000	**1.0000**
$75,000	**1.5000**
$100,000	**2.0000**
$125,000	**2.5000**
$150,000	**3.0000**
$200,000	**4.0000**
$300,000	**6.0000**
$500,000	**10.0000**
$1,000,000	**20.0000**

for each add'l $10,000 above $1,000,000, add: **0.2000**

* This is the Total Coverage (B & C) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

Special (Non-Catastrophe)

Amount of Insurance*	All Perils Deductible $500
$1,000	**0.0200**
$3,000	**0.0600**
$5,000	**0.1000**
$10,000	**0.2000**
$15,000	**0.3000**
$20,000	**0.4000**
$30,000	**0.6000**
$40,000	**0.8000**
$50,000	**1.0000**
$75,000	**1.5000**
$100,000	**2.0000**
$125,000	**2.5000**
$150,000	**3.0000**
$200,000	**4.0000**
$300,000	**6.0000**
$500,000	**10.0000**
$1,000,000	**20.0000**

for each add'l $10,000 above $1,000,000, add: **0.2000**

* This is the Total Coverage (B & C) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

Fire Following Earthquake **All Perils Deductible**

Amount of Insurance*	$500
$1,000	**0.0200**
$3,000	**0.0600**
$5,000	**0.1000**
$10,000	**0.2000**
$15,000	**0.3000**
$20,000	**0.4000**
$30,000	**0.6000**
$40,000	**0.8000**
$50,000	**1.0000**
$75,000	**1.5000**
$100,000	**2.0000**
$125,000	**2.5000**
$150,000	**3.0000**
$200,000	**4.0000**
$300,000	**6.0000**
$500,000	**10.0000**
$1,000,000	**20.0000**

for each add'l $10,000 above $1,000,000, add: **0.2000**

* This is the Total Coverage (B & C) limit on the policy.

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	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

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	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE FACTORS

USAA GROUP
DWELLING AND CONDO
COVERAGE C

Amount of Insurance*	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Fire Following Earthquake
$2,500	**1.0000**	**1.0000**	**1.0000**	**1.0000**
$3,000	**1.1193**	**1.0969**	**1.1708**	**1.1193**
$4,000	**1.3578**	**1.2693**	**1.5017**	**1.3578**
$5,000	**1.5963**	**1.4212**	**1.8209**	**1.5963**
$6,000	**1.8349**	**1.5592**	**2.1326**	**1.8349**
$7,000	**2.0734**	**1.6859**	**2.4364**	**2.0734**
$8,000	**2.3119**	**1.8045**	**2.7360**	**2.3119**
$9,000	**2.5505**	**1.9133**	**3.0273**	**2.5505**
$10,000	**2.7890**	**2.0203**	**3.3175**	**2.7890**
$15,000	**3.9817**	**2.4819**	**4.7120**	**3.9817**
$20,000	**5.1743**	**2.8717**	**6.0417**	**5.1743**
$30,000	**7.5596**	**3.5276**	**8.5827**	**7.5596**
$40,000	**9.9450**	**4.0801**	**11.0010**	**9.9450**
$50,000	**12.3303**	**4.5703**	**13.3470**	**12.3303**
$75,000	**18.2936**	**5.6165**	**18.9654**	**18.2936**
$100,000	**24.2569**	**6.4874**	**24.2991**	**24.2569**
$200,000	**48.1101**	**9.1197**	**44.0299**	**48.1101**
for each add'l $10,000 above $200,000, add:	**1.3000**	**0.2424**	**1.9326**	**1.3000**

* This is the Coverage C (Contents) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

Fire (Non-Catastrophe)

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**1.2004**	**1.1603**
$50,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**1.0000**	**0.8592**
$100,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.8592**	**0.7000**
$125,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.8123**	**0.6697**
$150,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7756**	**0.6459**
$175,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7343**	**0.6186**
$200,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7000**	**0.5960**
$225,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6831**	**0.5651**
$250,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6688**	**0.5500**
$275,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6565**	**0.5167**
$300,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6459**	**0.4973**
$400,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.5852**	**0.4303**
$500,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.5500**	**0.4146**
$750,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.4775**	**0.3581**
$1,000,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.4146**	**0.3109**
$1,500,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.3731**	**0.2798**
$2,000,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.3524**	**0.2643**
for each add'l $10,000 above $2,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Dwelling) limit on the policy.

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Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
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DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

EC (Non-Catastrophe)

	Wind/Hail Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**1.1360**	**1.0993**
$50,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**1.0000**	**0.8623**
$100,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.8623**	**0.7000**
$125,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.8020**	**0.6525**
$150,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.7530**	**0.6140**
$175,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.7246**	**0.5957**
$200,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.7000**	**0.5800**
$225,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.6785**	**0.5579**
$250,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.6592**	**0.5500**
$275,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.6418**	**0.5203**
$300,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.6260**	**0.5041**
$400,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.5754**	**0.4529**
$500,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.5500**	**0.4200**
$750,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.4660**	**0.3667**
$1,000,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.4200**	**0.3360**
$1,500,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.3780**	**0.3024**
$2,000,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.3592**	**0.2873**

for each add'l $10,000 above $2,000,000, add:

0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Dwelling) limit on the policy.

State: ARKANSAS
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JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: UNITED SERVICES AUTOMOBILE ASSOCIATION
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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

Broad (Non-Catastrophe)

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**1.2000**	**1.1600**
$50,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**1.0000**	**0.8592**
$100,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.8592**	**0.7000**
$125,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.8114**	**0.6691**
$150,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7756**	**0.6460**
$175,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7340**	**0.6184**
$200,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7000**	**0.5960**
$225,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6834**	**0.5726**
$250,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6691**	**0.5500**
$275,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6568**	**0.5350**
$300,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6460**	**0.5198**
$400,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.5961**	**0.4642**
$500,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.5500**	**0.4146**
$750,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.4775**	**0.3643**
$1,000,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.4146**	**0.3141**
$1,500,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.3644**	**0.2733**
$2,000,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.3141**	**0.2356**
for each add'l $10,000 above $2,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**-0.0002**	**-0.0002**

* This is the Coverage A (Dwelling) limit on the policy

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DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

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DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

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DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

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DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

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DEDUCTIBLE FACTORS

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DWELLING
COVERAGE C

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DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

Fire Following Earthquake

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**1.0467**	**1.0342**
$50,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**1.0000**	**0.9558**
$100,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9558**	**0.9032**
$125,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9408**	**0.8901**
$150,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9292**	**0.8800**
$175,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9149**	**0.8675**
$200,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9032**	**0.8572**
$225,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8960**	**0.8429**
$250,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8898**	**0.8351**
$275,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8845**	**0.8202**
$300,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8799**	**0.8111**
$400,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8572**	**0.7651**
$500,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8351**	**0.7216**
$750,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.7763**	**0.6598**
$1,000,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.7216**	**0.5989**
$1,500,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.6134**	**0.5030**
$2,000,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.5917**	**0.4734**
for each add'l $10,000 above $2,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**-0.0005**	**-0.0004**

* This is the Coverage A (Dwelling) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

Fire (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**1.1406**	**1.0000**	**0.8592**	**1.6114**	**1.4006**
$5,000	**1.1406**	**1.0000**	**0.8592**	**1.3805**	**1.2004**
$10,000	**1.1406**	**1.0000**	**0.8592**	**1.2004**	**1.1603**
$15,000	**1.1406**	**1.0000**	**0.8592**	**1.1798**	**1.1109**
$20,000	**1.1406**	**1.0000**	**0.8592**	**1.1600**	**1.0539**
$30,000	**1.1406**	**1.0000**	**0.8592**	**1.1110**	**0.9700**
$40,000	**1.1406**	**1.0000**	**0.8592**	**1.0543**	**0.9130**
$50,000	**1.1406**	**1.0000**	**0.8592**	**1.0000**	**0.8592**
$60,000	**1.1406**	**1.0000**	**0.8592**	**0.9663**	**0.8207**
$75,000	**1.1406**	**1.0000**	**0.8592**	**0.9270**	**0.7756**
$100,000	**1.1406**	**1.0000**	**0.8592**	**0.8592**	**0.7000**
$125,000	**1.1406**	**1.0000**	**0.8592**	**0.8123**	**0.6697**
$150,000	**1.1406**	**1.0000**	**0.8592**	**0.7756**	**0.6459**
$200,000	**1.1406**	**1.0000**	**0.8592**	**0.7000**	**0.5960**
$300,000	**1.1406**	**1.0000**	**0.8592**	**0.6459**	**0.4973**
$500,000	**1.1406**	**1.0000**	**0.8592**	**0.5500**	**0.4146**
$1,000,000	**1.1406**	**1.0000**	**0.8592**	**0.4146**	**0.3109**
for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Building Items) limit on the policy.

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

EC (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**1.0818**	**1.0000**	**0.8623**	**1.5245**	**1.3254**
$5,000	**1.0818**	**1.0000**	**0.8623**	**1.3064**	**1.1360**
$10,000	**1.0818**	**1.0000**	**0.8623**	**1.1360**	**1.0993**
$15,000	**1.0818**	**1.0000**	**0.8623**	**1.1176**	**1.0649**
$20,000	**1.0818**	**1.0000**	**0.8623**	**1.0993**	**1.0318**
$30,000	**1.0818**	**1.0000**	**0.8623**	**1.0649**	**0.9708**
$40,000	**1.0818**	**1.0000**	**0.8623**	**1.0321**	**0.9149**
$50,000	**1.0818**	**1.0000**	**0.8623**	**1.0000**	**0.8623**
$60,000	**1.0818**	**1.0000**	**0.8623**	**0.9678**	**0.8140**
$75,000	**1.0818**	**1.0000**	**0.8623**	**0.9285**	**0.7552**
$100,000	**1.0818**	**1.0000**	**0.8623**	**0.8623**	**0.7000**
$125,000	**1.0818**	**1.0000**	**0.8623**	**0.8020**	**0.6525**
$150,000	**1.0818**	**1.0000**	**0.8623**	**0.7530**	**0.6140**
$200,000	**1.0818**	**1.0000**	**0.8623**	**0.7000**	**0.5800**
$300,000	**1.0818**	**1.0000**	**0.8623**	**0.6260**	**0.5041**
$500,000	**1.0818**	**1.0000**	**0.8623**	**0.5500**	**0.4200**
$1,000,000	**1.0818**	**1.0000**	**0.8623**	**0.4200**	**0.3360**
for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Building Items) limit on the policy.

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

Broad (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**1.1406**	**1.0000**	**0.8592**	**1.6097**	**1.4000**
$5,000	**1.1406**	**1.0000**	**0.8592**	**1.3800**	**1.2000**
$10,000	**1.1406**	**1.0000**	**0.8592**	**1.2000**	**1.1600**
$15,000	**1.1406**	**1.0000**	**0.8592**	**1.1797**	**1.1109**
$20,000	**1.1406**	**1.0000**	**0.8592**	**1.1606**	**1.0542**
$30,000	**1.1406**	**1.0000**	**0.8592**	**1.1109**	**0.9699**
$40,000	**1.1406**	**1.0000**	**0.8592**	**1.0542**	**0.9129**
$50,000	**1.1406**	**1.0000**	**0.8592**	**1.0000**	**0.8592**
$60,000	**1.1406**	**1.0000**	**0.8592**	**0.9656**	**0.8198**
$75,000	**1.1406**	**1.0000**	**0.8592**	**0.9268**	**0.7754**
$100,000	**1.1406**	**1.0000**	**0.8592**	**0.8592**	**0.7000**
$125,000	**1.1406**	**1.0000**	**0.8592**	**0.8114**	**0.6691**
$150,000	**1.1406**	**1.0000**	**0.8592**	**0.7756**	**0.6460**
$200,000	**1.1406**	**1.0000**	**0.8592**	**0.7000**	**0.5960**
$300,000	**1.1406**	**1.0000**	**0.8592**	**0.6460**	**0.5198**
$500,000	**1.1406**	**1.0000**	**0.8592**	**0.5500**	**0.4146**
$1,000,000	**1.1406**	**1.0000**	**0.8592**	**0.4146**	**0.3141**
for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Building Items) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
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JANUARY 1, 2015 (RENEWAL BUSINESS)
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USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
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DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
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	JANUARY 1, 2015 (RENEWAL BUSINESS)
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DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
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	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
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	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

Fire Following Earthquake

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**1.0281**	**1.0000**	**0.9558**	**1.4041**	**1.2207**
$5,000	**1.0281**	**1.0000**	**0.9558**	**1.2037**	**1.0467**
$10,000	**1.0281**	**1.0000**	**0.9558**	**1.0467**	**1.0342**
$15,000	**1.0281**	**1.0000**	**0.9558**	**1.0404**	**1.0225**
$20,000	**1.0281**	**1.0000**	**0.9558**	**1.0341**	**1.0108**
$30,000	**1.0281**	**1.0000**	**0.9558**	**1.0223**	**0.9910**
$40,000	**1.0281**	**1.0000**	**0.9558**	**1.0110**	**0.9732**
$50,000	**1.0281**	**1.0000**	**0.9558**	**1.0000**	**0.9558**
$60,000	**1.0281**	**1.0000**	**0.9558**	**0.9896**	**0.9435**
$75,000	**1.0281**	**1.0000**	**0.9558**	**0.9778**	**0.9292**
$100,000	**1.0281**	**1.0000**	**0.9558**	**0.9558**	**0.9033**
$125,000	**1.0281**	**1.0000**	**0.9558**	**0.9408**	**0.8901**
$150,000	**1.0281**	**1.0000**	**0.9558**	**0.9292**	**0.8800**
$200,000	**1.0281**	**1.0000**	**0.9558**	**0.9032**	**0.8572**
$300,000	**1.0281**	**1.0000**	**0.9559**	**0.8799**	**0.8111**
$500,000	**1.0281**	**1.0000**	**0.9558**	**0.8351**	**0.7216**
$1,000,000	**1.0281**	**1.0000**	**0.9558**	**0.7216**	**0.5989**
for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**-0.0005**	**-0.0004**

* This is the Coverage A (Building Items) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

PROTECTION / CONSTRUCTION FACTORS

USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Construction Type	Protection Class	Fire* (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments**
Frame	1	**0.9590**	**0.9688**	**0.9982**	**0.9982**	**1.0000**	**1.0000**
	2	**0.9888**	**0.9739**	**0.9982**	**0.9982**	**1.0000**	**1.0000**
	3	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
	4	**1.0579**	**1.0400**	**1.0004**	**1.0004**	**1.0000**	**1.0834**
	5	**1.2346**	**1.0679**	**1.0033**	**1.0033**	**1.0000**	**1.1367**
	6	**1.3219**	**1.0820**	**1.0085**	**1.0085**	**1.0000**	**1.4597**
	7	**1.3981**	**1.0820**	**1.0134**	**1.0134**	**1.0000**	**1.4762**
	8	**1.5476**	**1.0820**	**1.0244**	**1.0244**	**1.0000**	**1.7004**
	8b	**1.5959**	**1.0820**	**1.0493**	**1.0493**	**1.0000**	**1.7251**
	9	**1.7892**	**1.0820**	**1.0493**	**1.0493**	**1.0000**	**1.7251**
	10	**1.8676**	**1.0820**	**1.0549**	**1.0549**	**1.0000**	**1.7251**
Masonry	1	**0.7700**	**0.9342**	**1.0224**	**1.0224**	**0.8822**	**0.9889**
	2	**0.8043**	**0.9400**	**1.0224**	**1.0224**	**0.8822**	**0.9889**
	3	**0.8300**	**0.9663**	**1.0242**	**1.0242**	**0.8822**	**0.9889**
	4	**0.8662**	**0.9874**	**1.0247**	**1.0247**	**0.8822**	**1.0714**
	5	**0.9994**	**0.9974**	**1.0276**	**1.0276**	**0.8822**	**1.1241**
	6	**1.0826**	**1.0106**	**1.0329**	**1.0329**	**0.8822**	**1.4436**
	7	**1.1209**	**1.0106**	**1.0379**	**1.0379**	**0.8822**	**1.4598**
	8	**1.1984**	**1.0509**	**1.0490**	**1.0490**	**0.8822**	**1.6816**
	8b	**1.2555**	**1.0509**	**1.0743**	**1.0743**	**0.8822**	**1.7060**
	9	**1.4839**	**1.0509**	**1.0743**	**1.0743**	**0.8822**	**1.7060**
	10	**1.5267**	**1.0509**	**1.0800**	**1.0800**	**0.8822**	**1.7060**

* Fire (Non-Catastrophe) factors also apply to the Fire portion of Increased Fair Rental Value coverage
** Liability and Medical Payments are optional coverages

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

ROOF FACTORS

USAA GROUP
DWELLING
COVERAGE A

Roof Type	Code	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
Aluminum	AL	**1.2350**	**1.1471**	**1.0000**	**1.0000**	**1.0000**
Asbestos	AS	**1.0000**	**1.1670**	**1.0000**	**1.0000**	**1.0000**
Cloth	CL	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Concrete Tile	CN	**0.7296**	**0.5464**	**1.0000**	**1.0000**	**1.0000**
Composition Shingle	CS	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Clay Tile	CT	**0.7343**	**0.5464**	**1.0000**	**1.0000**	**1.0000**
Composition Over Wood	CW	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**
Fiberglass Shingle	FB	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Fiber Cement	FC	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Resin Formed Shingle	FE	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Foam	FM	**1.0000**	**1.1670**	**1.0000**	**1.0000**	**1.0000**
Metal	MT	**1.2350**	**0.9663**	**1.0000**	**1.0000**	**1.0000**
None	NA	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**
Other	OT	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Plastic	PL	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Reinforced Plastic	RP	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Slate	SL	**1.1441**	**1.1198**	**1.0000**	**1.0000**	**1.0000**
Tar	TR	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Unknown	UN	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**
Wood Shake	WS	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**
No Data	X	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**

* Liability and Medical Payments are optional coverages

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

SQUARE FOOTAGE FACTORS

USAA GROUP
DWELLING
COVERAGE A and C

Minimum	Maximum	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
0	499	0.9761	0.6692	0.6349	0.6349	1.0000	1.0000
500	599	0.9807	0.6692	0.6349	0.6349	1.0000	1.0000
600	699	0.9822	0.6796	0.6483	0.6483	1.0000	1.0000
700	799	0.9830	0.6849	0.6550	0.6550	1.0000	1.0000
800	899	0.9845	0.6953	0.6685	0.6685	1.0000	1.0000
900	999	0.9861	0.7126	0.6820	0.6820	1.0000	1.0000
1000	1099	0.9876	0.7505	0.7157	0.7157	1.0000	1.0000
1100	1199	0.9891	0.7861	0.7525	0.7525	1.0000	1.0000
1200	1299	0.9907	0.8203	0.7892	0.7892	1.0000	1.0000
1300	1399	0.9922	0.8529	0.8256	0.8256	1.0000	1.0000
1400	1499	0.9938	0.8843	0.8617	0.8617	1.0000	1.0000
1500	1599	0.9953	0.9147	0.8972	0.8972	1.0000	1.0000
1600	1699	0.9969	0.9442	0.9322	0.9322	1.0000	1.0000
1700	1799	0.9985	0.9723	0.9665	0.9665	1.0000	1.0000
1800	1899	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1900	1999	1.0016	1.0269	1.0326	1.0326	1.0000	1.0056
2000	2099	1.0031	1.0528	1.0643	1.0643	1.0000	1.0111
2100	2199	1.0047	1.0781	1.0950	1.0950	1.0000	1.0165
2200	2299	1.0063	1.1028	1.1247	1.1247	1.0000	1.0218
2300	2399	1.0079	1.1270	1.1533	1.1533	1.0000	1.0270
2400	2499	1.0094	1.1507	1.1807	1.1807	1.0000	1.0322
2500	2599	1.0110	1.1739	1.2071	1.2071	1.0000	1.0372
2600	2699	1.0126	1.1966	1.2323	1.2323	1.0000	1.0422
2700	2799	1.0142	1.2189	1.2564	1.2564	1.0000	1.0471
2800	2899	1.0158	1.2409	1.2794	1.2794	1.0000	1.0518
2900	2999	1.0173	1.2622	1.3013	1.3013	1.0000	1.0565
3000	3099	1.0189	1.2832	1.3222	1.3222	1.0000	1.0611
3100	3199	1.0205	1.3042	1.3421	1.3421	1.0000	1.0656
3200	3299	1.0221	1.3247	1.3612	1.3612	1.0000	1.0700
3300	3399	1.0237	1.3446	1.3793	1.3793	1.0000	1.0743
3400	3499	1.0253	1.3642	1.3967	1.3967	1.0000	1.0785
3500	3599	1.0269	1.3839	1.4134	1.4134	1.0000	1.0826
3600	3699	1.0285	1.4032	1.4294	1.4294	1.0000	1.0866
3700	3799	1.0301	1.4220	1.4449	1.4449	1.0000	1.0905
3800	3899	1.0317	1.4406	1.4602	1.4602	1.0000	1.0943
3900	3999	1.0334	1.4587	1.4749	1.4749	1.0000	1.0979
4000	4099	1.0350	1.4768	1.4896	1.4896	1.0000	1.1015
4100	4199	1.0366	1.4945	1.5043	1.5043	1.0000	1.1049
4200	4299	1.0382	1.5122	1.5189	1.5189	1.0000	1.1083
4300	4399	1.0398	1.5299	1.5336	1.5336	1.0000	1.1115
4400	4499	1.0415	1.5471	1.5510	1.5510	1.0000	1.1146
4500	4599	1.0431	1.5628	1.5799	1.5799	1.0000	1.1176
4600	4699	1.0447	1.5785	1.6088	1.6088	1.0000	1.1205
4700	4799	1.0464	1.5942	1.6377	1.6377	1.0000	1.1232

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Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

SQUARE FOOTAGE FACTORS

USAA GROUP
DWELLING
COVERAGE A and C

Minimum	Maximum	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
4800	4899	**1.0480**	**1.6098**	**1.6666**	**1.6666**	**1.0000**	**1.1258**
4900	4999	**1.0496**	**1.6255**	**1.6955**	**1.6955**	**1.0000**	**1.1284**
5000	5499	**1.0513**	**1.6412**	**1.7244**	**1.7244**	**1.0000**	**1.1308**
5500	5999	**1.0595**	**1.7196**	**1.7894**	**1.7894**	**1.0000**	**1.1408**
6000	6499	**1.0679**	**1.7979**	**1.8275**	**1.8275**	**1.0000**	**1.1549**
6500	6999	**1.0764**	**1.8763**	**1.8539**	**1.8539**	**1.0000**	**1.1642**
7000	7499	**1.0849**	**1.9159**	**1.8802**	**1.8802**	**1.0000**	**1.1735**
7500	9999	**1.0934**	**1.9391**	**1.9551**	**1.9551**	**1.0000**	**1.2015**
10000	and greater	**1.1359**	**2.0549**	**2.0504**	**2.0504**	**1.0000**	**1.2341**

* Liability and Medical Payments are optional coverages

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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

NUMBER OF FAMILIES FACTORS

USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Number of Families	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
1	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
2	**1.0900**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
3	**1.2500**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
4+	**1.5950**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**

* Liability and Medical Payments are optional coverages

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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

MISCELLANEOUS RATING FACTORS

HOME PROTECTOR COVERAGE FACTOR
USAA GROUP
DWELLING
COVERAGE A

Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
1.1500	**1.1500**	**1.1500**	**1.1500**	**1.0000**

BUILDER'S RISK FACTOR
USAA GROUP
DWELLING
COVERAGE A

Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
0.7000	**0.7000**	**0.7000**	**0.7000**	**1.0000**

VACANT/UNOCCUPIED FACTOR
USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
1.5000	**1.5000**	**1.5000**	**1.5000**	**1.5000**	**1.5000**

OTHER STRUCTURES COVERAGE AMOUNT FACTOR
USAA GROUP
DWELLING
COVERAGE A

Coverage B Amount	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
10% of Coverage A	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
15% of Coverage A	**1.0369**	**1.0369**	**1.0369**	**1.0455**	**1.0000**
25% of Coverage A	**1.0813**	**1.0813**	**1.0813**	**1.1364**	**1.0000**
50% of Coverage A	**1.1430**	**1.1430**	**1.1430**	**1.3473**	**1.0000**
75% of Coverage A	**1.1989**	**1.1989**	**1.1989**	**1.5735**	**1.0000**
100% of Coverage A	**1.2524**	**1.2524**	**1.2524**	**1.8182**	**1.0000**

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MISCELLANEOUS RATING FACTORS

INCREASED LIABILITY LIMIT FACTOR
USAA GROUP
ALL STRUCTURE TYPES

Liability Limit	Factor
$300,000	**1.0000**
$500,000	**1.1154**
$1,000,000	**1.2769**

RATE CAPS

Structure Type	Limit	Type	USAA	USAA-CIC	USAA-GIC	Garrison
DWELLING	Lower	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
	Higher	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
CONDO	Lower	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
	Higher	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
MISCELLANEOUS	Lower	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
	Higher	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**

* Liability and Medical Payments are optional coverages

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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DISCOUNTS AND SURCHARGES

PROTECTIVE DEVICE CREDIT
USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
Monitored Fire Alarm	**0.9500**	--	--	--	--	--
Automatic Sprinklers in all areas except attic, bathroom, closet, and attached structures	**0.8000**	--	--	--	--	--

CLAIMS FREE DISCOUNT
USAA GROUP
DWELLING AND CONDO
ALL COVERAGES

Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special** (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
0.9000	**0.9000**	**0.9000**	**0.9000**	**0.9000**	**0.9000**

CLAIMS ACTIVITY SURCHARGE
USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Prior Non-Weather Claims	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
0	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
1	**1.1710**	**1.1241**	**1.2909**	**1.2909**	**1.0000**	**1.1823**
2	**1.5061**	**1.3107**	**1.6092**	**1.6092**	**1.0000**	**1.5643**
3	**1.9214**	**1.5197**	**1.9107**	**1.9107**	**1.0000**	**2.0502**
4	**2.3097**	**1.8662**	**2.2739**	**2.2739**	**1.0000**	**2.7561**
for each add'l claim above 4 add:	**0.2600**	**0.5900**	**0.3200**	**0.3200**	**0.0000**	**0.3200**

* Liability and Medical Payments are optional coverages
** Claims Free Discount factor for Special (Non-Catastrophe) also applies to Water Backup / Sump Pump coverage

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DISCOUNTS AND SURCHARGES

HOME AGE DISCOUNT
USAA GROUP
DWELLING
COVERAGE A and C

Dwelling Age (Years)	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments**
0	0.4116	0.3105	0.3707	0.3707	0.8630	0.6541
1	0.4245	0.3416	0.4003	0.4003	0.8630	0.6769
2	0.4387	0.3758	0.4324	0.4324	0.8630	0.6981
3	0.4540	0.4134	0.4669	0.4669	0.8651	0.7176
4	0.4704	0.4547	0.5044	0.5044	0.8673	0.7354
5	0.4879	0.5002	0.5447	0.5447	0.8694	0.7515
6	0.5063	0.5502	0.5883	0.5883	0.8715	0.7661
7	0.5256	0.6052	0.6353	0.6353	0.8737	0.7791
8	0.5457	0.6657	0.6862	0.6862	0.8758	0.7907
9	0.5664	0.7323	0.7410	0.7410	0.8780	0.8009
10	0.5877	0.8025	0.7892	0.7892	0.8801	0.8098
11	0.6095	0.8655	0.8305	0.8305	0.8823	0.8175
12	0.6316	0.9189	0.8660	0.8660	0.8845	0.8241
13	0.6540	0.9602	0.8961	0.8961	0.8866	0.8297
14	0.6765	0.9877	0.9213	0.9213	0.8888	0.8345
15	0.6989	1.0000	0.9420	0.9420	0.8910	0.8384
16	0.7213	1.0000	0.9590	0.9590	0.8932	0.8416
17	0.7433	1.0000	0.9722	0.9722	0.8954	0.8442
18	0.7650	1.0000	0.9825	0.9825	0.8976	0.8463
19	0.7862	1.0000	0.9901	0.9901	0.8998	0.8479
20	0.8068	1.0000	0.9954	0.9954	0.9020	0.8491
21	0.8267	1.0000	0.9986	0.9986	0.9042	0.8500
22	0.8457	1.0000	1.0000	1.0000	0.9065	0.8507
23	0.8639	1.0000	0.9998	0.9998	0.9087	0.8512
24	0.8811	1.0000	0.9983	0.9983	0.9109	0.8516
25	0.8973	1.0000	0.9955	0.9955	0.9132	0.8519
26	0.9123	1.0000	0.9918	0.9918	0.9154	0.8521
27	0.9263	1.0000	0.9872	0.9872	0.9176	0.8524
28	0.9391	1.0000	0.9818	0.9818	0.9199	0.8527
29	0.9507	1.0000	0.9758	0.9758	0.9222	0.8530
30	0.9611	1.0000	0.9692	0.9692	0.9244	0.8535
31	0.9703	1.0000	0.9621	0.9621	0.9267	0.8541
32	0.9784	1.0000	0.9546	0.9546	0.9290	0.8548
33	0.9854	1.0000	0.9468	0.9468	0.9313	0.8557
34	0.9912	1.0000	0.9390	0.9390	0.9336	0.8568
35	1.0000	1.0000	0.9309	0.9309	0.9359	0.8581
36	1.0000	1.0000	0.9223	0.9223	0.9382	0.8595
37	1.0000	1.0000	0.9140	0.9140	0.9405	0.8612
38	1.0000	1.0000	0.9053	0.9053	0.9428	0.8631
39	1.0000	1.0000	0.8967	0.8967	0.9451	0.8651
40	1.0000	1.0000	0.8882	0.8882	0.9474	0.8674
41	1.0000	1.0000	0.8794	0.8794	0.9497	0.8699

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DISCOUNTS AND SURCHARGES

HOME AGE DISCOUNT
USAA GROUP
DWELLING
COVERAGE A and C

Dwelling Age (Years)	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments**
42	1.0000	1.0000	0.8708	0.8708	0.9521	0.8725
43	1.0000	1.0000	0.8624	0.8624	0.9544	0.8754
44	1.0000	1.0000	0.8539	0.8539	0.9568	0.8785
45	1.0000	1.0000	0.8452	0.8452	0.9591	0.8817
46	1.0000	1.0000	0.8368	0.8368	0.9615	0.8851
47	1.0000	1.0000	0.8287	0.8287	0.9638	0.8887
48	1.0000	1.0000	0.8204	0.8204	0.9662	0.8924
49	1.0000	1.0000	0.8122	0.8122	0.9686	0.8962
50	1.0000	1.0000	0.8043	0.8043	0.9710	0.9002
51	1.0000	1.0000	0.7963	0.7963	0.9734	0.9043
52	1.0000	1.0000	0.7886	0.7886	0.9757	0.9085
53	1.0000	1.0000	0.7810	0.7810	0.9781	0.9128
54	1.0000	1.0000	0.7733	0.7733	0.9805	0.9171
55	1.0000	1.0000	0.7660	0.7660	0.9830	0.9215
56	1.0000	1.0000	0.7587	0.7587	0.9854	0.9259
57	1.0000	1.0000	0.7514	0.7514	0.9878	0.9304
58	1.0000	1.0000	0.7445	0.7445	0.9902	0.9348
59	1.0000	1.0000	0.7372	0.7372	0.9927	0.9393
60	1.0000	1.0000	0.7307	0.7307	0.9951	0.9437
61	1.0000	1.0000	0.7238	0.7238	0.9975	0.9481
62	1.0000	1.0000	0.7174	0.7174	1.0000	0.9524
63	1.0000	1.0000	0.7110	0.7110	1.0000	0.9568
64	1.0000	1.0000	0.7045	0.7045	1.0000	0.9609
65	1.0000	1.0000	0.6985	0.6985	1.0000	0.9650
66	1.0000	1.0000	0.6924	0.6924	1.0000	0.9691
67	1.0000	1.0000	0.6863	0.6863	1.0000	0.9731
68	1.0000	1.0000	0.6803	0.6803	1.0000	0.9769
69	1.0000	1.0000	0.6748	0.6748	1.0000	0.9805
70	1.0000	1.0000	0.6694	0.6694	1.0000	0.9842
71	1.0000	1.0000	0.6638	0.6638	1.0000	0.9876
72	1.0000	1.0000	0.6582	0.6582	1.0000	0.9908
73	1.0000	1.0000	0.6532	0.6532	1.0000	0.9940
74	1.0000	1.0000	0.6481	0.6481	1.0000	0.9972
75	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000
76	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000
77	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000

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DISCOUNTS AND SURCHARGES

HOME AGE DISCOUNT
USAA GROUP
DWELLING
COVERAGE A and C

Dwelling Age (Years)	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments**
78	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
79	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
80	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
81	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
82	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
83	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
84	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
85	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
86	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
87	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
88	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
89	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
90	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
91	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
92	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
93	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
94	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
95	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
96	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
97	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
98	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
99	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**
100+	**1.0000**	**1.0000**	**0.6430**	**0.6430**	**1.0000**	**1.0000**

* Liability and Medical Payments are optional coverages

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DISCOUNTS AND SURCHARGES

MULTI-PRODUCT DISCOUNT*
USAA GROUP
DWELLING AND CONDO
ALL COVERAGES
RPI + Auto

Territory	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special** (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments***
All	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**

* Only one combination of the Multi-Product Discount can apply
** Special (Non-Catastrophe) factor also applies to Water Backup / Sump Pump coverage
*** Liability and Medical Payments are optional coverages

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
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Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
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DISCOUNTS AND SURCHARGES

MULTI-PRODUCT DISCOUNT*
USAA GROUP
DWELLING AND CONDO
ALL COVERAGES
RPI + Homeowners/Renters

Territory	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special** (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments***
All	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**

* Only one combination of the Multi-Product Discount can apply
** Special (Non-Catastrophe) factor also applies to Water Backup / Sump Pump coverage
*** Liability and Medical Payments are optional coverages

State: **ARKANSAS**
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DISCOUNTS AND SURCHARGES

MULTI-PRODUCT DISCOUNT*
USAA GROUP
DWELLING AND CONDO
ALL COVERAGES
RPI + Auto + Homeowners/Renters

Territory	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special** (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments***
All	**0.9000**	**0.9000**	**0.9000**	**0.9000**	**0.9000**	**0.9000**

* Only one combination of the Multi-Product Discount can apply
** Special (Non-Catastrophe) factor also applies to Water Backup / Sump Pump coverage
*** Liability and Medical Payments are optional coverages

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)** **JANUARY 1, 2015 (RENEWAL BUSINESS)**
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION** **USAA CASUALTY INSURANCE COMPANY** **USAA GENERAL INDEMNITY COMPANY** **GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY**

OTHER COVERAGES

INCREASED FAIR RENTAL VALUE
DWELLING

	BASE RATE PER $1,000			
	USAA	USAA-CIC	USAA-GIC	Garrison
Fire	**2.20**	**3.15**	**3.15**	**3.15**
EC	**0.91**	**1.33**	**1.33**	**1.33**
Special	**0.90**	**1.31**	**1.31**	**1.31**

INCREASED FAIR RENTAL VALUE
CONDO

	BASE RATE PER $1,000			
	USAA	USAA-CIC	USAA-GIC	Garrison
Fire	**2.19**	**3.32**	**3.32**	**3.32**
EC	**0.91**	**1.33**	**1.33**	**1.33**
Special	**0.90**	**1.31**	**1.31**	**1.31**

WATER BACKUP/SUMP PUMP OVERFLOW
DWELLING AND CONDO

BASE RATE	USAA	USAA-CIC	USAA-GIC	Garrison
	57.00	**57.00**	**57.00**	**57.00**

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

Earthquake Coverage

Rate per $1000 for coverages A, B, D, or E, Improvements, & Other Building Options:

Zone	Construction	USAA	CIC	GIC	Garrison
2	Frame	$0.40	$0.40	$0.40	$0.40
	Masonry	$0.97	$0.97	$0.97	$0.97
	Superior	$0.40	$0.40	$0.40	$0.40
3	Frame	$0.27	$0.27	$0.27	$0.27
	Masonry	$0.73	$0.73	$0.73	$0.73
	Superior	$0.27	$0.27	$0.27	$0.27
4	Frame	$0.27	$0.27	$0.27	$0.27
	Masonry	$0.52	$0.52	$0.52	$0.52
	Superior	$0.27	$0.27	$0.27	$0.27
5	Frame	$0.20	$0.20	$0.20	$0.20
	Masonry	$0.37	$0.37	$0.37	$0.37
	Superior	$0.19	$0.19	$0.19	$0.19

Rate per $1000 for Coverage C & Other Personal Property Options:

Zone	Construction	USAA	CIC	GIC	Garrison
2	Frame	$0.40	$0.40	$0.40	$0.40
	Masonry	$0.97	$0.97	$0.97	$0.97
	Superior	$0.40	$0.40	$0.40	$0.40
3	Frame	$0.27	$0.27	$0.27	$0.27
	Masonry	$0.73	$0.73	$0.73	$0.73
	Superior	$0.27	$0.27	$0.27	$0.27
4	Frame	$0.27	$0.27	$0.27	$0.27
	Masonry	$0.52	$0.52	$0.52	$0.52
	Superior	$0.27	$0.27	$0.27	$0.27
5	Frame	$0.20	$0.20	$0.20	$0.20
	Masonry	$0.37	$0.37	$0.37	$0.37
	Superior	$0.19	$0.19	$0.19	$0.19

United Services Automobile Association (USAA)
Arkansas Rental Property Insurance Underwriting Tier Placement Guidelines

Tier Placement

A risk may be acceptable in one of the filed tiers. Placement in these tiers is dependent on the combination of underwriting characteristics reflected by the insured. Underwriting tier placement factors are grouped into two categories; Financial Responsibility and Relationship. The factors are then evaluated based on each insured's characteristics.

Tier placement is re-evaluated at the time of each renewal.

Financial Responsibility

- Credit-based Insurance Score – Higher credit-based insurance scores (insurance scores) are more favorable than lower insurance scores. The insurance score is determined using the Attract One model. An insurance score is ordered for new policies and every two years for renewal policies. The insurance score will be held and used in tier placement until a new score is ordered. Insureds with twenty-five or more years of USAA Enterprise tenure that have insurance scores below neutral will be treated as having neutral insurance scores for new and renewal business. Insureds with ten or more years of USAA Enterprise tenure will not see a premium increase at renewal due to the use of the reordered score. The score used will be the better of the prior available score or the reordered score. In the absence of credit information for an applicant or insured, or when an insurance score is unable to be calculated, then an insurance score is not used as an underwriting factor, and tier placement is based only on the other underwriting criteria.

- USAA Group Non-payment Cancellations – USAA Group insureds that have not been issued a notice for non-payment cancellation or had a P&C policy cancelled for non-payment in the last three years are more favorable than those insureds that have had either or a combination of these.

Relationship

- P&C Collateral – Insureds having other USAA Group P&C products are considered more favorable due to the depth of relationship established with USAA. P&C Collateral also considers products placed with appointing carriers through the USAA Insurance Agency. Products considered are active umbrella or "other"(VPP, Boat, Agency Boat, Agency PAF, Agency Umb, Agency Home) lines of business for the named insured and/or spouse.

- Enterprise Collateral – Insureds having enterprise products issued by non-P&C USAA subsidiary companies are considered more favorable due to the depth of relationship established. Enterprise collateral considers qualifying products placed through the USAA Federal Savings Bank, USAA Investment Management Company (IMCO) and USAA Life Insurance Company. Active enterprise products are considered for the named insured and/or spouse.

- Enterprise Tenure – The longest length of time since either the named insured or spouse obtained their first USAA Group property & casualty insurance, bank, life insurance or investment product. Insureds with longer relationships with USAA are more favorable than those with shorter relationships with USAA.

- Commission Source- Officers who have demonstrated advanced levels of responsibility as a result of their source of commission are more favorable than those with lower levels of responsibility.

USAA Casualty Insurance Company (CIC)
Arkansas Rental Property Insurance Underwriting Tier Placement Guidelines

Tier Placement

A risk may be acceptable in one of the filed tiers. Placement in these tiers is dependent on the combination of underwriting characteristics reflected by the insured. Underwriting tier placement factors are grouped into two categories; Financial Responsibility and Relationship. The factors are then evaluated based on each insured's characteristics.

Tier placement is re-evaluated at the time of each renewal.

Financial Responsibility

- Credit-based Insurance Score – Higher credit-based insurance scores (insurance scores) are more favorable than lower insurance scores. The insurance score is determined using the Attract One model. An insurance score is ordered for new policies and every two years for renewal policies. The insurance score will be held and used in tier placement until a new score is ordered. Insureds with twenty-five or more years of USAA Enterprise tenure that have insurance scores below neutral will be treated as having neutral insurance scores for new and renewal business. Insureds with ten or more years of USAA Enterprise tenure will not see a premium increase at renewal due to the use of the reordered score. The score used will be the better of the prior available score or the reordered score. In the absence of credit information for an applicant or insured, or when an insurance score is unable to be calculated, then an insurance score is not used as an underwriting factor, and tier placement is based only on the other underwriting criteria.

- USAA Group Non-payment Cancellations – USAA Group insureds that have not been issued a notice for non-payment cancellation or had a P&C policy cancelled for non-payment in the last three years are more favorable than those insureds that have had either or a combination of these.

Relationship

- P&C Collateral – Insureds having other USAA Group P&C products are considered more favorable due to the depth of relationship established with USAA. P&C Collateral also considers products placed with appointing carriers through the USAA Insurance Agency. Products considered are active umbrella or "other"(VPP, Boat, Agency Boat, Agency PAF, Agency Umb, Agency Home) lines of business for the named insured and/or spouse.

- Enterprise Collateral – Insureds having enterprise products issued by non-P&C USAA subsidiary companies are considered more favorable due to the depth of relationship established. Enterprise collateral considers qualifying products placed through the USAA Federal Savings Bank, USAA Investment Management Company (IMCO) and USAA Life Insurance Company. Active enterprise products are considered for the named insured and/or spouse.

- Enterprise Tenure – The longest length of time since either the named insured or spouse obtained their first USAA Group property & casualty insurance, bank, life insurance or investment product. Insureds with longer relationships with USAA are more favorable than those with shorter relationships with USAA.

- Commission Source- Officers who have demonstrated advanced levels of responsibility as a result of their source of commission are more favorable than those with lower levels of responsibility.

USAA General Indemnity Company (GIC)
Arkansas Rental Property Insurance Underwriting Tier Placement Guidelines

Tier Placement

A risk may be acceptable in one of the filed tiers. Placement in these tiers is dependent on the combination of underwriting characteristics reflected by the insured. Underwriting tier placement factors are grouped into two categories; Financial Responsibility and Relationship. The factors are then evaluated based on each insured's characteristics.

Tier placement is re-evaluated at the time of each renewal.

Financial Responsibility

- Credit-based Insurance Score – Higher credit-based insurance scores (insurance scores) are more favorable than lower insurance scores. The insurance score is determined using the Attract One model. An insurance score is ordered for new policies and every two years for renewal policies. The insurance score will be held and used in tier placement until a new score is ordered. Insureds with twenty-five or more years of USAA Enterprise tenure that have insurance scores below neutral will be treated as having neutral insurance scores for new and renewal business. Insureds with ten or more years of USAA Enterprise tenure will not see a premium increase at renewal due to the use of the reordered score. The score used will be the better of the prior available score or the reordered score. In the absence of credit information for an applicant or insured, or when an insurance score is unable to be calculated, then an insurance score is not used as an underwriting factor, and tier placement is based only on the other underwriting criteria.

- USAA Group Non-payment Cancellations – USAA Group insureds that have not been issued a notice for non-payment cancellation or had a P&C policy cancelled for non-payment in the last three years are more favorable than those insureds that have had either or a combination of these.

Relationship

- P&C Collateral – Insureds having other USAA Group P&C products are considered more favorable due to the depth of relationship established with USAA. P&C Collateral also considers products placed with appointing carriers through the USAA Insurance Agency. Products considered are active umbrella or "other"(VPP, Boat, Agency Boat, Agency PAF, Agency Umb, Agency Home) lines of business for the named insured and/or spouse.

- Enterprise Collateral – Insureds having enterprise products issued by non-P&C USAA subsidiary companies are considered more favorable due to the depth of relationship established. Enterprise collateral considers qualifying products placed through the USAA Federal Savings Bank, USAA Investment Management Company (IMCO) and USAA Life Insurance Company. Active enterprise products are considered for the named insured and/or spouse.

- Enterprise Tenure – The longest length of time since either the named insured or spouse obtained their first USAA Group property & casualty insurance, bank, life insurance or investment product. Insureds with longer relationships with USAA are more favorable than those with shorter relationships with USAA.

- Commission Source- Officers who have demonstrated advanced levels of responsibility as a result of their source of commission are more favorable than those with lower levels of responsibility.

Garrison Property and Casualty Insurance Company (GAR)
Arkansas Rental Property Insurance Underwriting Tier Placement Guidelines

Tier Placement

A risk may be acceptable in one of the filed tiers. Placement in these tiers is dependent on the combination of underwriting characteristics reflected by the insured. Underwriting tier placement factors are grouped into two categories; Financial Responsibility and Relationship. The factors are then evaluated based on each insured's characteristics.

Tier placement is re-evaluated at the time of each renewal.

Financial Responsibility

- Credit-based Insurance Score – Higher credit-based insurance scores (insurance scores) are more favorable than lower insurance scores. The insurance score is determined using the Attract One model. An insurance score is ordered for new policies and every two years for renewal policies.   The insurance score will be held and used in tier placement until a new score is ordered. Insureds with twenty-five or more years of USAA Enterprise tenure that have insurance scores below neutral will be treated as having neutral insurance scores for new and renewal business. Insureds with ten or more years of USAA Enterprise tenure will not see a premium increase at renewal due to the use of the reordered score. The score used will be the better of the prior available score or the reordered score. In the absence of credit information for an applicant or insured, or when an insurance score is unable to be calculated, then an insurance score is not used as an underwriting factor, and tier placement is based only on the other underwriting criteria.

- USAA Group Non-payment Cancellations – USAA Group insureds that have not been issued a notice for non-payment cancellation or had a P&C policy cancelled for non-payment in the last three years are more favorable than those insureds that have had either or a combination of these.

Relationship

- P&C Collateral – Insureds having other USAA Group P&C products are considered more favorable due to the depth of relationship established with USAA. P&C Collateral also considers products placed with appointing carriers through the USAA Insurance Agency. Products considered are active umbrella or "other"(VPP, Boat, Agency Boat, Agency PAF, Agency Umb, Agency Home) lines of business for the named insured and/or spouse.

- Enterprise Collateral – Insureds having enterprise products issued by non-P&C USAA subsidiary companies are considered more favorable due to the depth of relationship established. Enterprise collateral considers qualifying products placed through the USAA Federal Savings Bank, USAA Investment Management Company (IMCO) and USAA Life Insurance Company. Active enterprise products are considered for the named insured and/or spouse.

- Enterprise Tenure – The longest length of time since either the named insured or spouse obtained their first USAA Group property & casualty insurance, bank, life insurance or investment product. Insureds with longer relationships with USAA are more favorable than those with shorter relationships with USAA.

- Commission Source- Officers who have demonstrated advanced levels of responsibility as a result of their source of commission are more favorable than those with lower levels of responsibility.

Supporting Document Schedules

Bypassed - Item:	H-1 Homeowners Abstract
Bypass Reason:	Not Applicable.
Attachment(s):	
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	HPCS-Homeowners Premium Comparison Survey
Comments:	
Attachment(s):	HO Survey FORM HPCS (USAA-GIC).xls HO Survey FORM HPCS (USAA-GIC).pdf HO Survey FORM HPCS (GARRISON).xls HO Survey FORM HPCS (GARRISON).pdf HO Survey FORM HPCS (USAA).xls HO Survey FORM HPCS (USAA).pdf HO Survey FORM HPCS (USAA-CIC).xls HO Survey FORM HPCS (USAA-CIC).pdf
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	NAIC loss cost data entry document
Comments:	
Attachment(s):	FORM RF-1 (USAA).pdf FORM RF-1 (USAA-CIC).pdf FORM RF-1 (USAA-GIC).pdf FORM RF-1 (GARRISON).pdf
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	AR Rental Property Insurance Explanatory Memorandum
Comments:	
Attachment(s):	AR Rental Property Insurance Explanatory Memorandum.pdf
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	CONFIDENTIAL: AR Rental Property Insurance Detailed Tier Placement Guidelines - USAA Group
Comments:	
Attachment(s):	AR RPI Detailed Tier Placement Guidelines-USAA Group.pdf

Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	AIR EQ Model for the U.S.
Comments:	
Attachment(s):	AIR EQ Model for the U.S. (Part 1 of 2).pdf AIR EQ Model for the U.S. (Part 2 of 2).pdf
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	Attract One NCOIL
Comments:	
Attachment(s):	Attract One NCOIL 03.14.pdf Attract One Overview - NCOIL 03.14.pdf
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	Exhibit I
Comments:	
Attachment(s):	Exhibit I.pdf
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	Exhibit II
Comments:	
Attachment(s):	Exhibit II.pdf
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	Exhibit III
Comments:	
Attachment(s):	Exhibit III.pdf
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	Exhibit IV
Comments:	
Attachment(s):	Exhibit IV.pdf

Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	Exhibit V
Comments:	
Attachment(s):	Exhibit V.pdf
Item Status:	Filed
Status Date:	08/20/2014

Satisfied - Item:	Exhibit VI - USAA & Exhibit VI - CIC Group
Comments:	
Attachment(s):	Exhibit VI - USAA.pdf Exhibit VI - CIC Group.pdf
Item Status:	Filed
Status Date:	08/20/2014

NAIC Number:	18600
Company Name:	USAA General Indemnity Company
Contact Person:	Nick F. Almendarez
Telephone No.:	800-531-8722, ext. 8-2844
Email Address:	nick.almendarez@usaa.com
Effective Date:	10/31/2014

Homeowners Premium Comparision Survey Form
FORM HPCS - last modified August, 2005

USE THE APPROPRIATE FORM BELOW - IF NOT APPLICABLE, LEAVE BLANK

Submit to: *Arkansas Insurance Department*
1200 West Third Street
Little Rock, AR 72201-1904
Telephone: *501-371-2800*
Email as an attachment to: insurance.pnc@arkansas.gov
You may also attach to a SERFF filing or submit on a cdr disk

Survey Form for HO3 (Homeowners) - Use $500 Flat Deductible (Covers risk of direct physical loss for dwelling and other structures; named perils for personal property, replacement cost on dwelling, actual cash value on personal property)

Public Protection Class	Dwelling Value	Washington		Baxter		Craighead		St. Francis		Desha		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$80,000																		
	$120,000																		
	$160,000																		
6	$80,000																		
	$120,000																		
	$160,000																		
9	$80,000																		
	$120,000																		
	$160,000																		

Survey Form for HO4 (Renters) - Use $500 Flat Deductible (Named perils for personal property, actual cash value for loss, liability and medical payments for others included)

Public Protection Class	Property Value	Washington		Baxter		Craighead		St. Francis		Arkansas		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$5,000																		
	$15,000																		
	$25,000																		
6	$5,000																		
	$15,000																		
	$25,000																		
9	$5,000																		
	$15,000																		
	$25,000																		

Survey Form for DP-2 (Dwelling/Fire) - Use $500 Flat Deductible (Named perils for dwelling and personal property; replacement cost for dwelling, actual cash value for personal property, no liability coverage)

Public Protection Class	Dwelling Value	Washington		Baxter		Craighead		St. Francis		Arkansas		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$80,000	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96
	$120,000	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32
	$160,000	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91
6	$80,000	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97
	$120,000	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97
	$160,000	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69
9	$80,000	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96
	$120,000	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48
	$160,000	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28

SPECIFY THE PERCENTAGE GIVEN FOR CREDITS OR DISCOUNTS FOR THE FOLLOWING:

HO3 and HO4 only

Fire Extinquisher	%	*Deadbolt Lock*	%
Burglar Alarm	%	*Window Locks*	%
Smoke Alarm	%	*$1,000 Deductible*	%
		Other (specify)	
			%
		Maximum Credit	%

EARTHQUAKE INSURANCE

IMPORTANT, Homeowners insurance does NOT automatically cover losses from earthquakes. Ask your agent about this coverage.

ARE YOU CURRENTLY WRITING EARTHQUAKE COVERAGE IN ARKANSAS? Yes *(yes or no)*

WHAT IS YOUR PERCENTAGE DEDUCTIBLE? 10 %

	Zone	Brick	Frame
WHAT IS YOUR PRICE PER $1,000 OF COVERAGE?	Highest Risk	$	$
	Lowest Risk	$	$

NAIC Number:	21253
Company Name:	Garrison Property and Casualty Insurance Company
Contact Person:	Nick F. Almendarez
Telephone No.:	800-531-8722, ext. 8-2844
Email Address:	nick.almendarez@usaa.com
Effective Date:	10/31/2014

Homeowners Premium Comparision Survey Form
FORM HPCS - last modified August, 2005

USE THE APPROPRIATE FORM BELOW - IF NOT APPLICABLE, LEAVE BLANK

Submit to: *Arkansas Insurance Department*
1200 West Third Street
Little Rock, AR 72201-1904
Telephone: *501-371-2800*
Email as an attachment to: insurance.pnc@arkansas.gov
You may also attach to a SERFF filing or submit on a cdr disk

Survey Form for HO3 (Homeowners) - Use $500 Flat Deductible (Covers risk of direct physical loss for dwelling and other structures; named perils for personal property, replacement cost on dwelling, actual cash value on personal property)

Public Protection Class	Dwelling Value	Washington		Baxter		Craighead		St. Francis		Desha		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$80,000																		
	$120,000																		
	$160,000																		
6	$80,000																		
	$120,000																		
	$160,000																		
9	$80,000																		
	$120,000																		
	$160,000																		

Survey Form for HO4 (Renters) - Use $500 Flat Deductible (Named perils for personal property, actual cash value for loss, liability and medical payments for others included)

Public Protection Class	Property Value	Washington		Baxter		Craighead		St. Francis		Arkansas		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$5,000																		
	$15,000																		
	$25,000																		
6	$5,000																		
	$15,000																		
	$25,000																		
9	$5,000																		
	$15,000																		
	$25,000																		

Survey Form for DP-2 (Dwelling/Fire) - Use $500 Flat Deductible (Named perils for dwelling and personal property; replacement cost for dwelling, actual cash value for personal property, no liability coverage)

Public Protection Class	Dwelling Value	Washington		Baxter		Craighead		St. Francis		Arkansas		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$80,000	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96
	$120,000	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32
	$160,000	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91
6	$80,000	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97
	$120,000	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97
	$160,000	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69
9	$80,000	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96
	$120,000	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48
	$160,000	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28

SPECIFY THE PERCENTAGE GIVEN FOR CREDITS OR DISCOUNTS FOR THE FOLLOWING:

HO3 and HO4 only

Fire Extinquisher	%	*Deadbolt Lock*	%
Burglar Alarm	%	*Window Locks*	%
Smoke Alarm	%	*$1,000 Deductible*	%
		Other (specify)	%
		Maximum Credit	%

EARTHQUAKE INSURANCE

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ARE YOU CURRENTLY WRITING EARTHQUAKE COVERAGE IN ARKANSAS? Yes *(yes or no)*

WHAT IS YOUR PERCENTAGE DEDUCTIBLE? 10 %

WHAT IS YOUR PRICE PER $1,000 OF COVERAGE?

Zone	Brick	Frame
Highest Risk	$	$
Lowest Risk	$	$

NAIC Number:	25941	
Company Name:	United Services Automobile Association	
Contact Person:	Nick F. Almendarez	
Telephone No.:	800-531-8722, ext. 8-2844	
Email Address:	nick.almendarez@usaa.com	
Effective Date:	10/31/2014	

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Survey Form for HO3 (Homeowners) - Use $500 Flat Deductible (Covers risk of direct physical loss for dwelling and other structures; named perils for personal property, replacement cost on dwelling, actual cash value on personal property)

Public Protection Class	Dwelling Value	Washington		Baxter		Craighead		St. Francis		Desha		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$80,000																		
	$120,000																		
	$160,000																		
6	$80,000																		
	$120,000																		
	$160,000																		
9	$80,000																		
	$120,000																		
	$160,000																		

Survey Form for HO4 (Renters) - Use $500 Flat Deductible (Named perils for personal property, actual cash value for loss, liability and medical payments for others included)

Public Protection Class	Property Value	Washington		Baxter		Craighead		St. Francis		Arkansas		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$5,000																		
	$15,000																		
	$25,000																		
6	$5,000																		
	$15,000																		
	$25,000																		
9	$5,000																		
	$15,000																		
	$25,000																		

Survey Form for DP-2 (Dwelling/Fire) - Use $500 Flat Deductible (Named perils for dwelling and personal property; replacement cost for dwelling, actual cash value for personal property, no liability coverage)

Public Protection Class	Dwelling Value	Washington		Baxter		Craighead		St. Francis		Arkansas		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$80,000	$768.20	$844.91	$768.20	$844.91	$768.20	$844.91	$768.20	$844.91	$768.20	$844.91	$768.20	$844.91	$768.20	$844.91	$768.20	$844.91	$768.20	$844.91
	$120,000	$976.14	$1,074.34	$976.14	$1,074.34	$976.14	$1,074.34	$976.14	$1,074.34	$976.14	$1,074.34	$976.14	$1,074.34	$976.14	$1,074.34	$976.14	$1,074.34	$976.14	$1,074.34
	$160,000	$1,155.60	$1,272.55	$1,155.60	$1,272.55	$1,155.60	$1,272.55	$1,155.60	$1,272.55	$1,155.60	$1,272.55	$1,155.60	$1,272.55	$1,155.60	$1,272.55	$1,155.60	$1,272.55	$1,155.60	$1,272.55
6	$80,000	$882.90	$1,000.81	$882.90	$1,000.81	$882.90	$1,000.81	$882.90	$1,000.81	$882.90	$1,000.81	$882.90	$1,000.81	$882.90	$1,000.81	$882.90	$1,000.81	$882.90	$1,000.81
	$120,000	$1,123.23	$1,273.85	$1,123.23	$1,273.85	$1,123.23	$1,273.85	$1,123.23	$1,273.85	$1,123.23	$1,273.85	$1,123.23	$1,273.85	$1,123.23	$1,273.85	$1,123.23	$1,273.85	$1,123.23	$1,273.85
	$160,000	$1,331.01	$1,510.08	$1,331.01	$1,510.08	$1,331.01	$1,510.08	$1,331.01	$1,510.08	$1,331.01	$1,510.08	$1,331.01	$1,510.08	$1,331.01	$1,510.08	$1,331.01	$1,510.08	$1,331.01	$1,510.08
9	$80,000	$1,055.42	$1,182.96	$1,055.42	$1,182.96	$1,055.42	$1,182.96	$1,055.42	$1,182.96	$1,055.42	$1,182.96	$1,055.42	$1,182.96	$1,055.42	$1,182.96	$1,055.42	$1,182.96	$1,055.42	$1,182.96
	$120,000	$1,345.07	$1,508.84	$1,345.07	$1,508.84	$1,345.07	$1,508.84	$1,345.07	$1,508.84	$1,345.07	$1,508.84	$1,345.07	$1,508.84	$1,345.07	$1,508.84	$1,345.07	$1,508.84	$1,345.07	$1,508.84
	$160,000	$1,596.09	$1,791.60	$1,596.09	$1,791.60	$1,596.09	$1,791.60	$1,596.09	$1,791.60	$1,596.09	$1,791.60	$1,596.09	$1,791.60	$1,596.09	$1,791.60	$1,596.09	$1,791.60	$1,596.09	$1,791.60

SPECIFY THE PERCENTAGE GIVEN FOR CREDITS OR DISCOUNTS FOR THE FOLLOWING:

HO3 and HO4 only

Fire Extinguisher	%	*Deadbolt Lock*	%
Burglar Alarm	%	*Window Locks*	%
Smoke Alarm	%	*$1,000 Deductible*	%
		Other (specify)	
			%
		Maximum Credit	%

EARTHQUAKE INSURANCE

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ARE YOU CURRENTLY WRITING EARTHQUAKE COVERAGE IN ARKANSAS? Yes *(yes or no)*

WHAT IS YOUR PERCENTAGE DEDUCTIBLE? 10 %

	Zone	Brick	Frame
WHAT IS YOUR PRICE PER $1,000 OF COVERAGE?	Highest Risk	$	$
	Lowest Risk	$	$

NAIC Number:	25968
Company Name:	USAA Casualty Insurance Company
Contact Person:	Nick F. Almendarez
Telephone No.:	800-531-8722, ext. 8-2844
Email Address:	nick.almendarez@usaa.com
Effective Date:	10/31/2014

Homeowners Premium Comparision Survey Form
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Public Protection Class	Dwelling Value	Washington		Baxter		Craighead		St. Francis		Desha		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$80,000																		
	$120,000																		
	$160,000																		
6	$80,000																		
	$120,000																		
	$160,000																		
9	$80,000																		
	$120,000																		
	$160,000																		

Survey Form for HO4 (Renters) - Use $500 Flat Deductible (Named perils for personal property, actual cash value for loss, liability and medical payments for others included)

Public Protection Class	Property Value	Washington		Baxter		Craighead		St. Francis		Arkansas		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$5,000																		
	$15,000																		
	$25,000																		
6	$5,000																		
	$15,000																		
	$25,000																		
9	$5,000																		
	$15,000																		
	$25,000																		

Survey Form for DP-2 (Dwelling/Fire) - Use $500 Flat Deductible (Named perils for dwelling and personal property; replacement cost for dwelling, actual cash value for personal property, no liability coverage)

Public Protection Class	Dwelling Value	Washington		Baxter		Craighead		St. Francis		Arkansas		Union		Miller		Sebastian		Pulaski	
		Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame	Brick	Frame
3	$80,000	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96	$1,052.97	$1,155.96
	$120,000	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32	$1,337.53	$1,469.32
	$160,000	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91	$1,582.99	$1,739.91
6	$80,000	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97	$1,207.07	$1,365.97
	$120,000	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97	$1,535.09	$1,737.97
	$160,000	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69	$1,818.55	$2,059.69
9	$80,000	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96	$1,438.28	$1,608.96
	$120,000	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48	$1,832.36	$2,051.48
	$160,000	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28	$2,173.73	$2,435.28

SPECIFY THE PERCENTAGE GIVEN FOR CREDITS OR DISCOUNTS FOR THE FOLLOWING:

HO3 and HO4 only

Fire Extinquisher	%	*Deadbolt Lock*	%
Burglar Alarm	%	*Window Locks*	%
Smoke Alarm	%	*$1,000 Deductible*	%
		Other (specify)	
			%
		Maximum Credit	%

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WHAT IS YOUR PERCENTAGE DEDUCTIBLE? 10 %

WHAT IS YOUR PRICE PER $1,000 OF COVERAGE?	Zone	Brick	Frame
	Highest Risk	$	$
	Lowest Risk	$	$

NAIC LOSS COST DATA ENTRY DOCUMENT

1.	This filing transmittal is part of Company Tracking #	**AR1418381**

2.	If filing is an adoption of an advisory organization loss cost filing, give name of Advisory Organization and Reference/ Item Filing Number	

		Company Name		Company NAIC Number
3.	**A.**	**United Services Automobile Association**	**B.**	**25941**

		Product Coding Matrix Line of Business (i.e., Type of Insurance)		Product Coding Matrix Line of Insurance (i.e., Sub-type of Insurance)
4.	**A.**	**30.1 Dwelling Fire / Personal Liability**	**B.**	**30.1000 Dwelling Fire / Personal Liability**

5.

(A) COVERAGE (See Instructions)	(B) Indicated % Rate Level Change	(C) Requested % Rate Level Change	FOR LOSS COSTS ONLY (D) Expected Loss Ratio	(E) Loss Cost Modification Factor	(F) Selected Loss Cost Multiplier	(G) Expense Constant (If Applicable)	(H) Co. Current Loss Cost Multiplier
USAA Fire	**n/a**	**18.4%**					
USAA Allied Lines	**n/a**	**-11.5%**					
USAA Miscellaneous	**n/a**	**-0.4%**					
TOTAL OVERALL EFFECT	**n/a**	**0.0%**					

6. 5 Year History Rate Change History

Year	Policy Count	% of Change	Effective Date	State Earned Premium (000)	Incurred Losses (000)	State Loss Ratio	Countrywide Loss Ratio
2013	**3,364**	**6.9%**	**2/22/2013**	**3,051**	**1,383**	**0.4533**	**0.5151**
2012	**3,181**	**13.0%**	**2/22/2012**	**2,503**	**1,062**	**0.4246**	**0.5449**
2011	**2,875**	**N/A**	**N/A**	**2,011**	**2,642**	**1.3134**	**0.6889**
2010	**2,579**	**12.0%**	**12/31/2010**	**1,639**	**1,160**	**0.7075**	**0.5699**
2009	**2,368**	**11.1%**	**2/28/2009**	**1,365**	**1,891**	**1.3847**	**0.5615**

7.

Expense Constants	Selected Provisions (Liab/PhyDam)
A. Total Production Expense	**10.7%**
B. General Expense	**1.2%**
C. Taxes, License & Fees	**2.9%**
D. Underwriting Profit & Contingencies	**15.0%**
E. Other (explain)	**-**
F. TOTAL	**29.7%**

8. _Apply Lost Cost Factors to Future filings? (Y or N)

9. _Estimated Maximum Rate Increase for any Insured (%). Territory (if applicable): +25.0%

10. _Estimated Maximum Rate Decrease for any Insured (%) Territory (if applicable): -25.0%

NAIC LOSS COST DATA ENTRY DOCUMENT

1.	This filing transmittal is part of Company Tracking #	**AR1418381**

2.	If filing is an adoption of an advisory organization loss cost filing, give name of Advisory Organization and Reference/ Item Filing Number	

		Company Name		Company NAIC Number
3.	**A.**	**USAA Casualty Insurance Company**	**B.**	**25968**

		Product Coding Matrix Line of Business (i.e., Type of Insurance)		Product Coding Matrix Line of Insurance (i.e., Sub-type of Insurance)
4.	**A.**	**30.1 Dwelling Fire / Personal Liability**	**B.**	**30.1000 Dwelling Fire / Personal Liability**

5.

(A) COVERAGE (See Instructions)	(B) Indicated % Rate Level Change	(C) Requested % Rate Level Change	FOR LOSS COSTS ONLY (D) Expected Loss Ratio	(E) Loss Cost Modification Factor	(F) Selected Loss Cost Multiplier	(G) Expense Constant (If Applicable)	(H) Co. Current Loss Cost Multiplier
CIC Fire	**n/a**	**16.3%**					
CIC Allied Lines	**n/a**	**-13.4%**					
CIC Miscellaneous	**n/a**	**1.0%**					
TOTAL OVERALL EFFECT	**n/a**	**-1.9%**					

6. 5 Year History — Rate Change History

Year	Policy Count	% of Change	Effective Date	State Earned Premium (000)	Incurred Losses (000)	State Loss Ratio	Countrywide Loss Ratio
2013	**606**	**7.0%**	**2/22/2013**	**766**	**266**	**0.3479**	**0.3820**
2012	**575**	**13.4%**	**2/22/2012**	**632**	**451**	**0.7142**	**0.4807**
2011	**533**	**N/A**	**N/A**	**486**	**603**	**1.2404**	**0.5692**
2010	**460**	**12.1%**	**12/31/2010**	**393**	**188**	**0.4793**	**0.5141**
2009	**403**	**11.4%**	**2/28/2009**	**330**	**241**	**0.7288**	**0.4507**

7.

Expense Constants	Selected Provisions (Liab/PhyDam)
A. Total Production Expense	**8.0%**
B. General Expense	**1.0%**
C. Taxes, License & Fees	**3.1%**
D. Underwriting Profit & Contingencies	**15.0%**
E. Other (explain)	
F. TOTAL	**27.1%**

8. _Apply Lost Cost Factors to Future filings? (Y or N)

9. _Estimated Maximum Rate Increase for any Insured (%). Territory (if applicable): +25.0%

10. _Estimated Maximum Rate Decrease for any Insured (%) Territory (if applicable): -25.0%

NAIC LOSS COST DATA ENTRY DOCUMENT

1.	This filing transmittal is part of Company Tracking #	**AR1418381**

2.	If filing is an adoption of an advisory organization loss cost filing, give name of Advisory Organization and Reference/ Item Filing Number	

		Company Name		Company NAIC Number
3.	**A.**	**USAA General Indemnity Company**	**B.**	**18600**

		Product Coding Matrix Line of Business (i.e., Type of Insurance)		Product Coding Matrix Line of Insurance (i.e., Sub-type of Insurance)
4.	**A.**	**30.1 Dwelling Fire / Personal Liability**	**B.**	**30.1000 Dwelling Fire / Personal Liability**

5.

(A) COVERAGE (See Instructions)	(B) Indicated % Rate Level Change	(C) Requested % Rate Level Change	FOR LOSS COSTS ONLY (D) Expected Loss Ratio	(E) Loss Cost Modification Factor	(F) Selected Loss Cost Multiplier	(G) Expense Constant (If Applicable)	(H) Co. Current Loss Cost Multiplier
GIC Fire	**n/a**	**23.7%**					
GIC Allied Lines	**n/a**	**-8.3%**					
GIC Miscellaneous	**n/a**	**1.3%**					
TOTAL OVERALL EFFECT	**n/a**	**4.1%**					

6. 5 Year History Rate Change History

Year	Policy Count	% of Change	Effective Date	State Earned Premium (000)	Incurred Losses (000)	State Loss Ratio	Countrywide Loss Ratio
2013	**381**	**7.1%**	**2/22/2013**	**369**	**327**	**0.8859**	**0.5499**
2012	**251**	**13.4%**	**2/22/2012**	**226**	**292**	**1.2885**	**0.5842**
2011	**166**	**N/A**	**N/A**	**113**	**282**	**2.4975**	**0.7785**
2010	**89**	**12.1%**	**12/31/2010**	**54**	**181**	**3.3460**	**0.4664**
2009	**40**	**11.2%**	**2/28/2009**	**10**	**6**	**0.6155**	**0.8278**

7.

Expense Constants	Selected Provisions (Liab/PhyDam)
A. Total Production Expense	**10.1%**
B. General Expense	**1.4%**
C. Taxes, License & Fees	**3.1%**
D. Underwriting Profit & Contingencies	**15.0%**
E. Other (explain)	
F. TOTAL	**29.6%**

8. _Apply Lost Cost Factors to Future filings? (Y or N)
9. _Estimated Maximum Rate Increase for any Insured (%). Territory (if applicable): +25.0%
10. _Estimated Maximum Rate Decrease for any Insured (%) Territory (if applicable): -25.0%

NAIC LOSS COST DATA ENTRY DOCUMENT

1. This filing transmittal is part of Company Tracking #	**AR1418381**

2. If filing is an adoption of an advisory organization loss cost filing, give name of Advisory Organization and Reference/ Item Filing Number	

		Company Name		Company NAIC Number
3.	**A.**	**Garrison Property and Casualty Insurance Company**	**B.**	**21253**

		Product Coding Matrix Line of Business (i.e., Type of Insurance)		Product Coding Matrix Line of Insurance (i.e., Sub-type of Insurance)
4.	**A.**	**30.1 Dwelling Fire / Personal Liability**	**B.**	**30.1000 Dwelling Fire / Personal Liability**

5.

(A) COVERAGE (See Instructions)	(B) Indicated % Rate Level Change	(C) Requested % Rate Level Change	FOR LOSS COSTS ONLY (D) Expected Loss Ratio	(E) Loss Cost Modification Factor	(F) Selected Loss Cost Multiplier	(G) Expense Constant (If Applicable)	(H) Co. Current Loss Cost Multiplier
Garrison Fire	**n/a**	**7.7%**					
Garrison Allied Lines	**n/a**	**-9.8%**					
Garrison Miscellaneous	**n/a**	**1.5%**					
TOTAL OVERALL EFFECT	**n/a**	**-2.2%**					

6. 5 Year History Rate Change History

Year	Policy Count	% of Change	Effective Date	State Earned Premium (000)	Incurred Losses (000)	State Loss Ratio	Countrywide Loss Ratio
2013	**153**	**7.5%**	**2/22/2013**	**160**	**58**	**0.3595**	**0.5166**
2012	**106**	**13.4%**	**2/22/2012**	**96**	**11**	**0.1120**	**0.5628**
2011	**70**	**N/A**	**N/A**	**63**	**39**	**0.6133**	**0.7605**
2010	**55**	**12.1%**	**12/31/2010**	**44**	**21**	**0.4854**	**0.6455**
2009	**42**	**11.4%**	**2/28/2009**	**32**	**13**	**0.4241**	**0.5282**

7.

Expense Constants	Selected Provisions (Liab/PhyDam)
A. Total Production Expense	**11.2%**
B. General Expense	**1.6%**
C. Taxes, License & Fees	**3.1%**
D. Underwriting Profit & Contingencies	**15.0%**
E. Other (explain)	
F. TOTAL	**30.9%**

8. _Apply Lost Cost Factors to Future filings? (Y or N)
9. _Estimated Maximum Rate Increase for any Insured (%). Territory (if applicable): +25.0%
10. _Estimated Maximum Rate Decrease for any Insured (%) Territory (if applicable): -25.0%

USAA Group
Arkansas
Rental Property Insurance Explanatory Memorandum

USAA Group (USAA, USAA-CIC, USAA-GIC, and Garrison) is introducing our Rental Property Insurance program to replace our current Dwelling Fire / Dwelling Liability program with an overall rate level effect of 0.0%. The combined Fire and Allied Lines rate level effect for USAA-CIC, USAA-GIC and Garrison collectively are 0.0%. These companies were analyzed together since they share identical rates and rating structures. The combined Fire and Allied Lines rate level effect for USAA is also 0.0%.

The proposed changes support the introduction of USAA's new Rental Property Insurance program. An integral part of the new program is the introduction of a redesigned rating plan, which is similar in structure to our current Homeowners rating plan. This new rating plan will improve USAA's ability to offer a fair and competitive rate. Rating structures at the peril level are also being introduced, further improving pricing accuracy.

The new rating plan was developed primarily using a multivariate approach to analysis called generalized linear modeling (GLM). GLM indications for non-catastrophe perils were developed using USAA Fire and Allied Lines pure premium data for the four policy years ending December 31, 2011 evaluated as of June 30, 2012. GLM indications for Earthquake and Fire Following Earthquake were developed using modeled average annual losses from catastrophe models created by AIR Worldwide. Selected factors are consistent with the GLM indicated factors while also taking competitive and member impact information into account. Base rates were derived to achieve the desired overall effects.

Several new rating structures are being introduced with this new rating plan:

- Underwriting Tier Factors
- Roof Type
- Square Footage
- Home Protector Coverage
- Claims Free Discount
- Home Age Discounts
- Multi-Product Discounts
- Claims Activity Surcharge
- Renewal Rate Capping

Additionally, rates and factors for several existing rating structures and discounts are being modified:

- Protective Device Credits
- Protection/Construction Factors
- Deductible Options and Factors
- Amount of Insurance Factors
- Number of Families Factors
- Builder's Risk Factors

- Vacant/Unoccupied Factors
- Rating for Other Structures policies
- Rating for Increased Fair Rental Value
- Increased Liability Limit Rates
- Water Backup/Sump Pump Overflow Endorsement
- Medical Payments Endorsement
- Earthquake Endorsement
- Minimum Premiums

Finally, these current rating structures are being removed with this new rating plan:

- Occupancy factors
- Seasonality factors

Details pertaining to all of these structures, including proposed factors and the new rating formula can be found in the rate and rule manual.

For new business, an effective date of October 31, 2014, for these revisions will apply to all policies. For renewal business, an effective date of January 1, 2015 for these revisions will apply to all policies. Details of these revisions are attached.

USAA Group
Arkansas
Rental Property Insurance Explanatory Memorandum

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Attachments in support of this filing:

GLM Explanatory Memo

GLM Modeling Process

Except where otherwise stated, indications for all proposed rating factors were determined using Generalized Linear Modeling (GLM). We developed several sets of models and used analysis tools to help us compare the models to one another. We used chi-square tests and looked at standard error of parameter differences to determine what variables to include in the final models and how to group and/or fit curves to those variables.

GLM is a multivariate predictive modeling method where

Response Variable = Systematic Component (Signal) + Random Component (Noise)

GLMs generalize traditional regression models by introducing nonlinearity through the link function and loosening the normality assumption (we used a Tweedie distribution to directly model pure premium). In our models we have used the log link function, which means that the rating factors are combined using straight-forward multiplication.

Response Variable = Product(Rating Factors) + Noise

We have utilized Towers Watson's GLM software for all our GLM modeling. This includes the latest available version of Emblem at the time of the analyses.

Non-Catastrophe Perils

The total database contained approximately 1.4M records for Dwelling and 200,000 records for Condos and was based on experience from the 4 policy years ending 12/31/2011 evaluated as of 6/30/2012.

The GLM software was used to estimate pure premium parameters that minimize variance from the actual data. We began with the assumption that pure premium could best be described by a Tweedie distribution, because this has been documented as a reasonable approach from both a theoretical and practical standpoint (see "A Practitioner's Guide to Generalized Linear models: A foundation for theory, interpretation and application", Third Edition-2007).

The final indicated factors were developed using the direct Pure Premium models. Because we used log link functions, the indicated rating factors directly support a multiplicative rating algorithm.

Catastrophe Perils

Due to the high variability of historical catastrophe losses, we use modeled losses from AIR's catastrophe models that are developed from 50,000 simulated years for Earthquake. The AIR model produces the expected loss for each policy based on the characteristics of the dwelling combined with various geological factors. We then used GLMs to develop pure premium models with an underlying Gamma distribution. Since we begin with modeled losses, the purpose of the GLM for each peril is not so much to predict the losses as it is to fit the AIR modeled losses to the rating variables that we have selected for each catastrophe peril.

The following outlines the number of records and AIR model used for the catastrophe peril models:

Earthquake Endorsement:

We begin with approximately 340,000 Dwelling and 58,000 Condos records representing modeled Earthquake losses on countrywide data excluding California policies (due to CEA), in force as of May 31, 2011. The countrywide earthquake model shows that some factors should differ by state (most notably Home Age), so Arkansas experience (about 3,000 Dwelling policies) was also examined to determine whether any factors should differ from countrywide. The specific AIR model that was used is the AIR Earthquake Model for the United States (USA_Eq Time Dep v.8.03.107).

Fire Following Earthquake:

We begin with approximately 229,000 Dwelling and 64,000 Condos records representing modeled Fire Following Earthquake losses on countrywide data excluding AK and HI policies (AIR doesn't include AK and HI), in force as of May 31, 2011. The specific AIR model that was used is the AIR Earthquake Model for the United States (USA_Eq Time Dep v.8.03.107).

AIR Earthquake Model for the United States

AIR WORLDWIDE

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Contact Information

If you have any questions regarding this document, contact:

AIR Worldwide
131 Dartmouth Street
Boston, MA 02116-5134
USA
Tel: (617) 267-6645
Fax: (617) 267-8284

Revision History

Date	Description
October 23, 2012	Updated Figure 71 to show Maximum Peak Floor Acceleration.

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1 Facts at a Glance

1.1 Model Facts

Model Name: AIR Earthquake Model for the United States

Release Date: July 2012 (first released in Version 14.0 of the AIR software systems)

Software Systems: CATRADER, CLASIC/2, CATStation

AIR Model Version: 8.4

Modeled Country: Continental United States

Modeled Perils: The perils included in this model are ground shaking, liquefaction, fire following and sprinkler leakage. The effects of tsunami and levee failure are not modeled. Landslides are also not explicitly modeled; however, because modeled losses have been calibrated to and validated against actual reported losses, the impact of landslides on modeled losses is captured implicitly.

Model Abstract: The AIR Earthquake Model for the United States captures the effects of ground shaking, liquefaction, fire following earthquakes, and sprinkler leakage on properties in the continental United States. This is a fully stochastic, event-based model designed for portfolio risk management. The model captures the complex seismicity of the continental United States by generating events along known crustal faults and the Cascadia subduction zone. Through the use of smoothed background seismicity, the model also captures the potential for earthquakes to occur where there has been little or no recorded historical seismic activity. The stochastic event generation process includes determination of the magnitude, location, rupture length and the width, depth, and fault orientation and mechanism. Attenuation relationships, surface geology classification, and site-amplification factors are considered for the local ground-shaking intensity calculations. The engineering component has been extensively validated against published research and observed damage data from historical earthquakes. The damage functions have undergone external peer review. Overall model performance has been validated against historical loss data from various events. The model's fire-following module, which includes fire ignition, spread, and suppression, takes into account the amounts of combustible and noncombustible exposures, the number and location of fire engines, wind speeds, and population counts. The AIR Earthquake Model for the United States has been developed to meet the wide spectrum of earthquake risk management needs of the insurance industry and accounts for policy conditions that are specific to the United States.

Model Domain: The model domain covers the continental United States, including the 48 conterminous states and Washington, DC. Seismic events generated in the model cover a region well beyond the boundaries of the United States, including Canada, Mexico and offshore subduction zones.

1.2 United States — Country Facts

Population: 310.2 million (est. as of 2010)

GDP (purchasing power parity): USD 14.26 trillion (est. as of 2009)

Per Capita GDP: USD 46,400 (est. as of 2009)

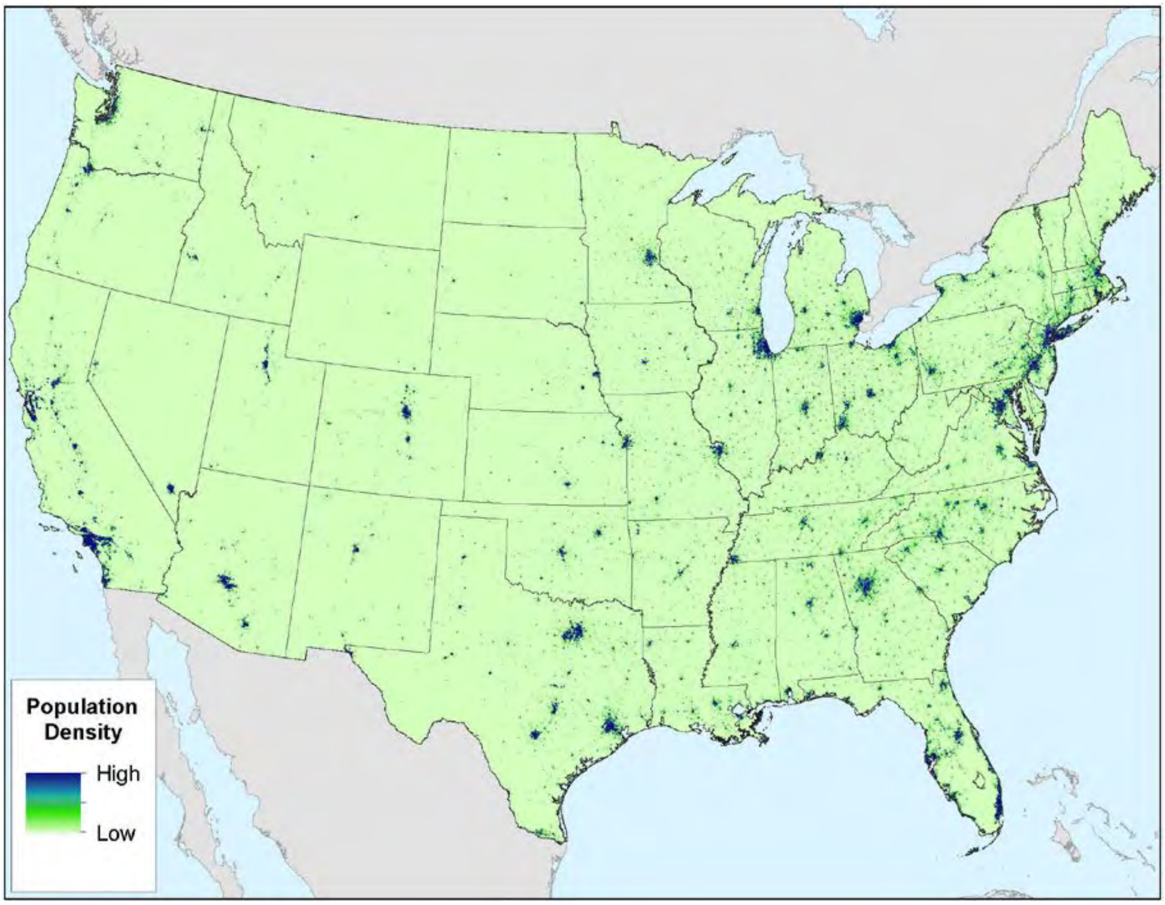

Figure 1. Population Density in the Continental United States

Figure 2 illustrates the density of ZIP Codes in continental United States, of which there are roughly 43,000.

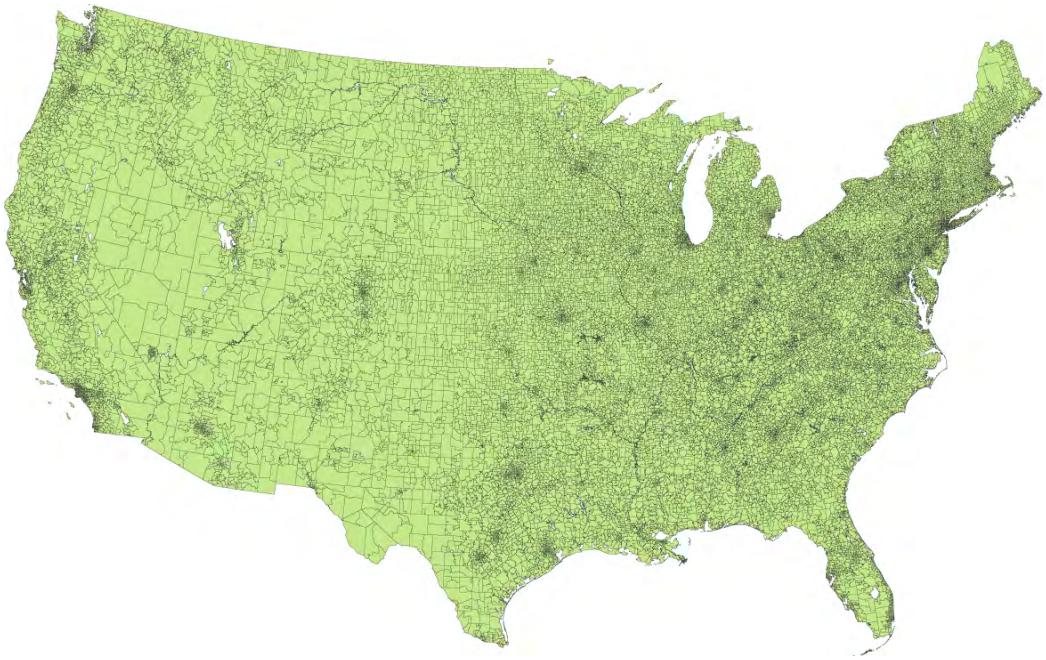

Figure 2. Map of the Continental United States showing the ZIP Codes

Figure 3 shows a zoom-in of ZIP Codes in the San Francisco area on the left and the Los Angeles and San Diego areas on the right.

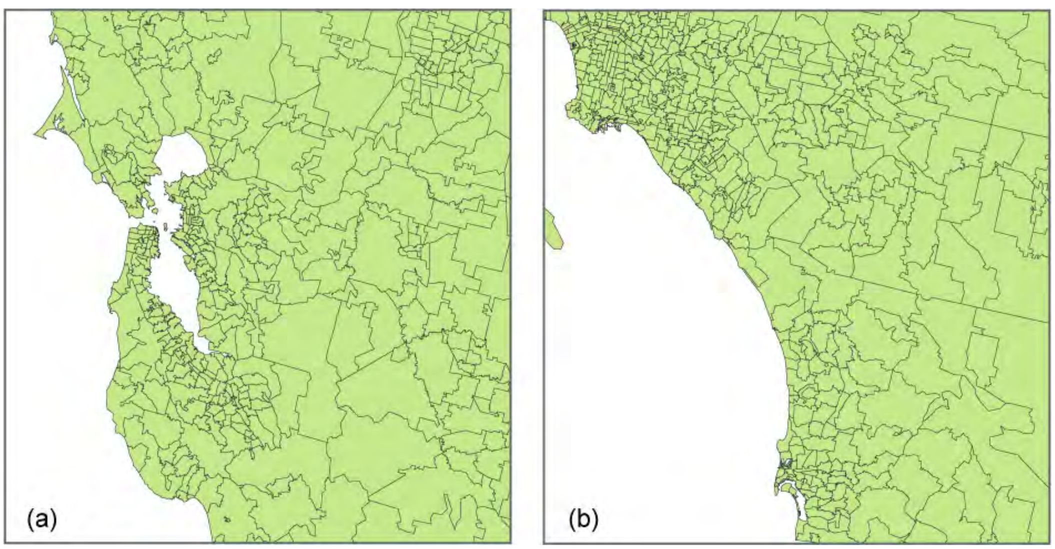

Figure 3. ZIP Codes in San Francisco (a), Los Angeles (b, upper left), and San Diego (b, bottom)

There are 3,109 counties or county equivalents in the continental United States, categorized as follows:

2,980 Counties
64 Parishes in Louisiana

42 Independent Cities (1 in MD 1 in MO, 1 in NV, and the remainder in VA)
1 District (District of Columbia)

Figure 4 shows the counties in the continental United States.

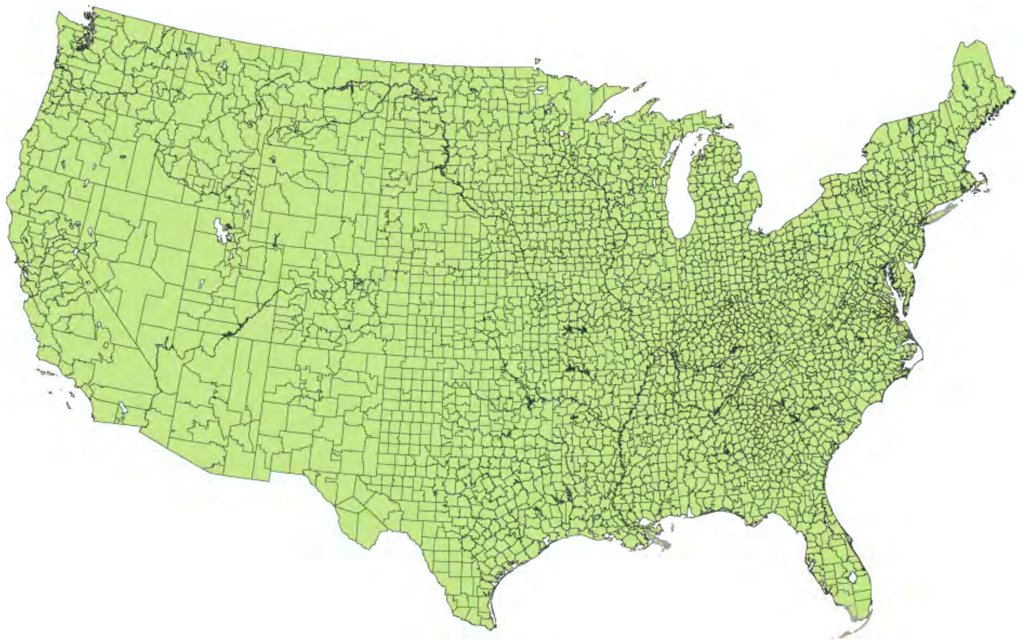

Figure 4. Map of Counties in the Continental United States

1.3 Data Sources

Key data sources used in the development of the AIR Earthquake Model for the United States are as follows:

Event Generation: Data for the model's hazard component came from the 2008 United States Geological Survey (USGS) national earthquake hazard model, which is described in USGS Open-File Report 2008-1128, *Documentation for the 2008 Update of the United States National Seismic Hazard Maps*. This information includes the process for determining event scenarios for the New Madrid Zone, and the zone boundaries in the Charleston area. Data for the time-dependent model incorporates information from the Working Group on California Earthquake Probabilities, using the empirical and fault-specific models from the Uniform California Earthquake Rupture Forecast (UCERF2).

Local Intensity: The AIR model implements attenuation equations, used by the USGS model, developed by Boore and Atkinson (2008), Campbell and Bozorgnia (2008), Chiou and Youngs (2008), and Abrahamson and Silva (2008). Additional equations were used to determine ground motion intensity for areas outside of California. Data on soil conditions and groundwater depth were obtained from the USGS and several state geological surveys. For a complete list of soil data sources, see Table 9. See Section 4 for details on all of the sources for local intensity data and attenuation equations that were used in the model.

Fire Following Module: Fire engine data was collected from individual local fire departments (see Figure 103 for source locations) and wind speed data was obtained from the National Weather Service.

1.4 Historical Catalog

The AIR Earthquake Model for the United States utilizes United States Geological Survey (USGS) seismic information on faults and background seismicity. Much of this information is based on the USGS historical catalog that is described in the publication, *Documentation for the 2008 Update of the United States National Seismic Hazard Maps* (USGS Open-File Report 2008-1128). For the western United States, historical earthquakes of moment magnitude (M_w) 4.0 or greater are considered; for the central and eastern United States, the minimum magnitude is mbLg 3.0[1]. Because the damage caused by earthquakes below magnitude M_W 5.0 is very limited in the United States, those events were excluded from the historical catalog which is released with the model.

1.5 Stochastic Catalog

The model incorporates two 10,000-year catalogs of simulated earthquakes: a time-dependent catalog with 68,877 events and a time-independent catalog with 68,570 events.[2] The time-dependent catalog is the standard (recommended and therefore default) catalog. Unless otherwise specified, the exhibits in this document refer to the time-dependent catalog. For more detail on time dependence, see Section 3.5.

The number of simulated years that contain a particular number of simulated earthquake events is illustrated in the following figures. Figure 5 shows the distribution of annual event frequency for the 10,000-year time-dependent model. Figure 6 shows the distribution of annual event frequency for the 10,000-year time-*in*dependent model.

[1] mbLg was converted into Mw using relationships from Johnston (Johnston, A.C., 1996a, “Seismic Moment Assessment of Earthquakes in Stable Continental Regions—I. Instrumental Seismicity,” *Geophysical Journal International*, 126:381–414)

[2] Note that catalogs of 50,000 and 100,000 years are also available. The 100,000-year time-dependent catalog consists of 685,830 events.

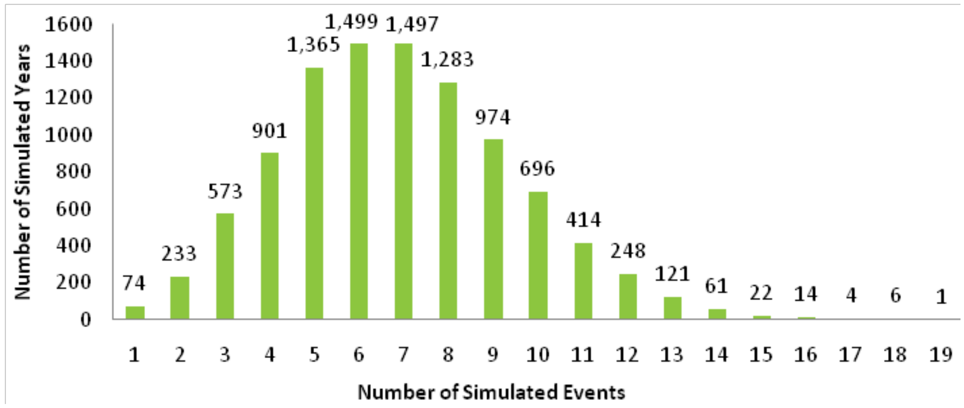

Figure 5. Distribution of Annual Simulated Event Frequency, 10K Time-Dependent Catalog

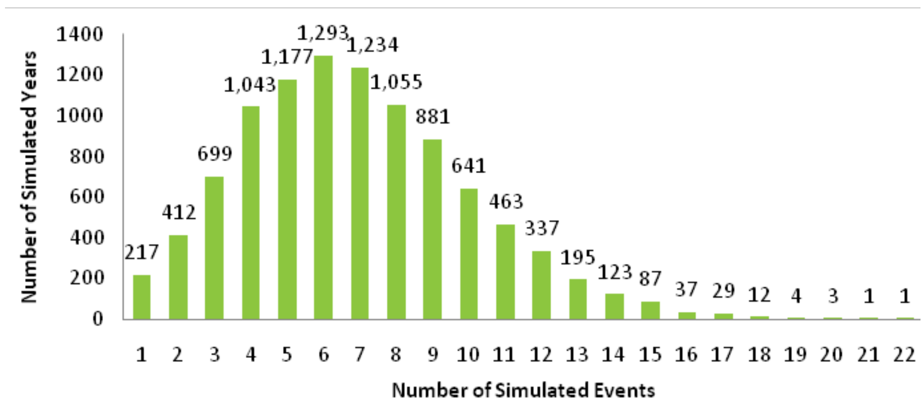

Figure 6. Distribution of Annual Simulated Event Frequency, 10K Time-Independent Catalog

Each event in the stochastic catalogs is associated with an epicenter, magnitude, rupture length and width, azimuth, dip, dip azimuth, depth, and rupture mechanism.

The magnitude distribution of simulated events is shown in the following tables. Table 1 and Table 2 show the magnitude distribution for the 10K time-dependent and time-independent models, respectively. The tables indicate that events of magnitude 5.0 to 5.5 constitute well over 50% of the simulated catalogs.

Table 1. Distribution of All Simulated Events by Magnitude – 10K Time-Dependent Catalog

Magnitude	≥ 8.0	7.5 to 8.0	7.0 to 7.5	6.5 to 7.0	6.0 to 6.5	5.5 to 6.0	5.0 to 5.5
Event Count	55	208	1,022	3,897	6,793	16,276	40,606
Percentage	0.07%	0.3%	1.5%	5.6%	9.9%	23.6%	58.9%

Table 2. Distribution of All Simulated Events by Magnitude – 10K Time-Independent Catalog

Magnitude	≥ 8.0	7.5 to 8.0	7.0 to 7.5	6.5 to 7.0	6.0 to 6.5	5.5 to 6.0	5.0 to 5.5
Event Count	51	221	1,031	3,912	6,840	16,385	40,110
Percentage	0.07%	0.3%	1.5%	5.7%	9.9%	23.9%	58.5%

1.6 Optimization of the Stochastic Catalog

Several regions of the United States display low levels of historical seismicity. In order to build a stochastic sample of simulated earthquake activity that adequately captures the seismicity in these regions, it was necessary to expand the sample to 1,000,000 years. This one-million-year catalog accurately represents the background seismicity in the areas of lowest seismicity, in accordance with the USGS.

However, loss calculations using a one-million-year catalog require extensive computational resources. In order to deliver catalogs to our clients that are both accurate and computationally efficient, an optimization process has been implemented to obtain a representative extraction from the 1M catalog of 100,000 years (10 times smaller) that minimizes sampling variability (the error that appears in the statistical characteristics of a sample when its size is reduced).

This process consists of a multi-criteria optimization procedure in which three aspects of the catalog are evaluated: the magnitude-rate distributions for each region in the US, the ground motion at specific locations and at specific return periods, and the loss distributions. Maintaining these three main traits of the one million year sample in a smaller 100,000-year sample is a complex endeavor that AIR solves using advanced evolutionary computation techniques. The result is a 100K catalog that performs similarly to the one-million-year catalog, not only with respect to the magnitude-rate distributions but also with respect to ground shaking and loss distribution.

Acknowledging that even catalogs of 100K-year length may still pose unacceptable computational demands when multiple runs are needed, AIR delivers a standard catalog of 10,000 years (and 50,000 years). This smaller catalog is again optimized from the 100K sample in order to obtain a catalog that is representative of the greater set (the sample of 10K must be included in the 100K catalog for software functionality purposes, therefore the extraction is not carried out directly from the one-million-year catalog). In this case, the optimization is performed based on loss distributions at the state level. This is accomplished in an iterative loop, where different potential extractions are evaluated based on the accuracy of the industry exceedance probability (EP) curves rendered by the 10K catalog in comparison to the industry EP curves constructed from the 100K sample. Special interest zones such as New Madrid are also included in the optimization to guarantee that the final 10K extraction yields results comparable to the 100K results even in areas of very low seismicity such as this one.

With these innovative techniques, AIR has succeeded in integrating the high accuracy of very large samples with the computational efficiency of smaller catalogs.

1.7 Model Resolution

The resolution of the surface-geology data used in shake-damage calculations varies from 50 meters for Manhattan island in New York City to 1,020 meters for eastern South Carolina. For most of the continental U.S., the model employs maps of about 500 meters resolution in the central and eastern part of the country, with exceptions in the New Madrid area, Charleston, and the northeast. The resolution used for most of California is 180 meters, with a 90-meter resolution for San Francisco, Los Angeles, and Santa Ana. Data at 190-meter resolution is used for Oregon, and a 90-meter resolution is used for Washington state.

Figure 7 illustrates the relative loss costs for earthquakes in the Continental U.S.

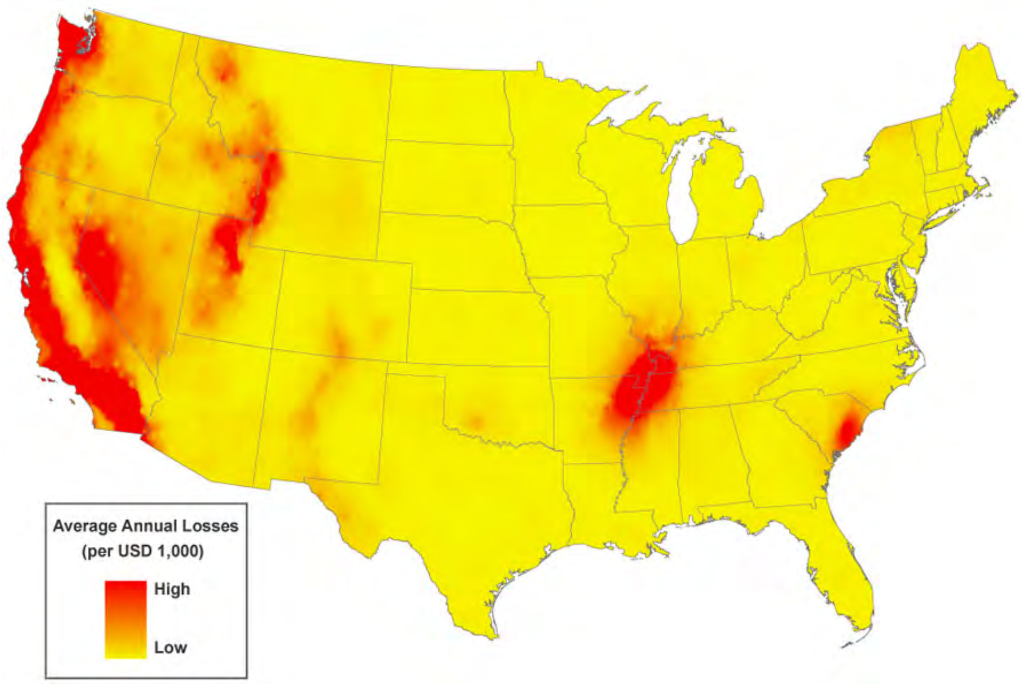

Figure 7. Earthquake Risk (Loss Costs) in the Continental United States

1.8 The United States Insurance Market

The United States property and casualty market is the largest in the world, with premiums totaling approximately USD 456 billion in 2010. Premiums have increased by about 1% as the industry recovers from the effects of the financial crisis. The US market is mostly privatized although the federal government does have programs to assist with flood damage and California has a program for earthquake coverage.

The earthquake risk in the continental United States is primarily associated with the west coast, with the highest concentration in California, where most of the population (over 36 million) resides along the coast in seismically active areas. North of California is the Cascadia subduction zone, which has the potential of producing massive earthquakes. However, even though the west coast is more seismically active than the rest of the country, 39 states are associated with earthquake risk. Some of the largest earthquakes in U.S. history occurred east of the Rocky Mountains, in New Madrid, Missouri, and Charleston, South Carolina. Recently, in August 2011, an M5.8 earthquake occurred in Mineral, Virginia, causing damage in Richmond and other cities including Washington, D.C. Insured loss was approximately USD 100 million from that event.

Earthquake damage is not covered under standard residential or commercial insurance policies, but is instead available as an endorsement to an existing policy. However, insurers that don't offer coverage for earthquake damage may still be affected by related losses such as those due to fires following an earthquake. These losses can increase due to claims for business interruption and additional living expenses. Cars and other vehicles are covered for earthquake damage under the comprehensive part of an auto insurance policy.

The most costly earthquake in U.S. history is the one that struck Northridge, California, on January 17, 1994. It caused an estimated USD 20 billion in property damage, including USD 12 billion in insured losses. Two years after the Northridge earthquake, the California Earthquake Authority (CEA) was created to ensure the availability of earthquake coverage for homeowners, which became increasingly hard to obtain due to insurers' fears of insolvency from another massive earthquake. The CEA is now one of the world's leading residential earthquake insurers, with 775,000 policies in force, and 17 participating insurers. However, only about 12% of homeowners in California buy earthquake coverage. This is a decrease from 30% in 1996, due to several factors including the high cost of earthquake coverage and the fact that earthquake insurance is not mandated by mortgage lenders.

The risk of insured losses due to earthquakes has increased in recent years due to increasing urban development in seismically active areas such as California, and the increasing vulnerability of older buildings, which may not have been built or upgraded to current building codes.

1.9 Navigating the Document

Figure 8 illustrates the components of the AIR Earthquake Model for the United States.

Section 2 of this document provides a brief overview of earthquakes and earthquake risk in the continental United States. Section 3 details the generation of simulated events that populate the stochastic catalog, and Section 4 describes how ground shaking is modeled locally.

Section 5 discusses the model's damage functions for residential, mobile home, commercial, and automobile properties, while Section 6 describes damage functions for industrial facilities.

Section 7 discusses insured loss calculation. Section 8 offers selected references and Section 9 provides an overview of AIR Worldwide .

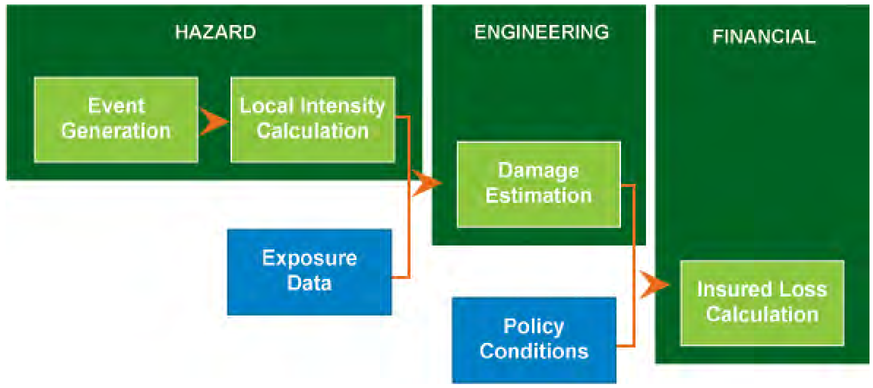

Figure 8. Components of the AIR Earthquake Model for the United States

2 Earthquakes in the Continental United States

This section provides an overview of earthquakes and introduces some important concepts in earthquake modeling.

2.1 Earthquakes: An Overview

An earthquake results from a sudden displacement of rock along a fault. It accompanies a rapid release of energy in the form of seismic waves, which propagate outward from a focus.

The process begins when rocks that experience stress along faults begin to deform as the strain within them builds. When the stress exceeds the strength of the rock and overcomes the friction that resists the relative movement of opposite sides of the fault, the fault ruptures and releases energy. Some of the energy released dissipates as friction along the fault; the rest is transferred as seismic waves that radiate from the initial point of rupture and cause ground motion at the earth's surface.

Faults are rarely found in isolation; instead, they tend to form zones of related fault traces. Long faults may be segmented, with each segment having an individual rupture history and mechanism. Ruptures during a weak to moderate earthquake are believed to be contained within one segment of a fault, but more powerful earthquakes may manifest themselves along multiple segments. Fault zones vary in depth, width, and orientation.

A fault plane can be vertical or sloping in relation to the earth's surface. In sloping faults, the rock volume above the fault plane is known as the hanging wall, and the rock volume below the fault plane is the footwall. One type of earthquake faulting mechanism is dip-slip, which can be subclassified as either normal or reverse faulting. Normal faulting occurs when the hanging wall slips down relative to the footwall, resulting in an extension of crustal matter. Reverse faulting occurs when the hanging wall lifts relative to the footwall, which causes a shortening of the crustal material. Strike-slip faults have a nearly vertical surface; their movement is horizontal, parallel to the strike of the fault surface. Oblique-slip faulting is a combination of strike-slip and normal or reverse faulting.

While faults may form a visible trace on the earth's surface, some remain buried within the earth. These blind faults represent a significant seismic hazard, as they are often difficult to detect prior to rupture. Hazard assessment of blind faults is challenging and often plagued with uncertainty.

Generally, active faults are those which have demonstrated activity during the last 10,000 years, or during the Holocene period. Potentially-active faults are those that have demonstrated activity during the last 1.65 million years, or during the Quaternary period.

Plate Tectonics

The theory of plate tectonics was developed to explain the evidence for large-scale motion of the earth's continents. The crust and upper mantle form the rigid, strong lithosphere, which is divided into large plates that move relative to one another. The largest plates are the Pacific, North American, South American, Eurasian, African, and Australian plates.

These lithospheric plates move over the asthenosphere, a hot, viscous layer of weak rock that is continuously moving and transferring heat from the interior to the surface of the earth. The boundaries between plates are where most earthquake and volcanic activity occurs.

There are several types of boundaries between neighboring plates. Convergent boundaries occur where two plates move towards one another; if one of these plates sinks, or subducts, beneath the edge of the other plate, a subduction zone is formed (Figure 9). Seismic activity may be particularly rampant in subduction zones.

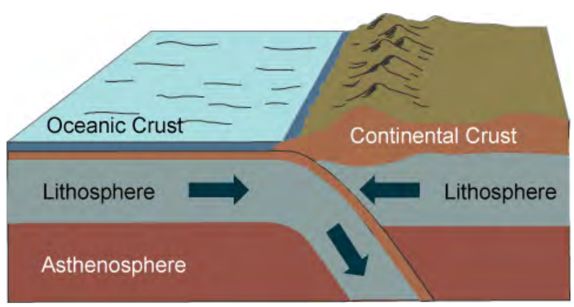

Figure 9. The Earth's Layers at a Subduction Zone

Continental-collision boundaries occur where two low-density plate edges move towards one another; this process may result in crustal rock being thrust upward, which is how linear mountain systems are formed. Divergent boundaries occur where plates move away from one another, which allows for the formation of new crustal material.

Transform boundaries occur where one plate moves past another. Due to massive amounts of friction, however, the plates do not simply glide past each other. Rather, stress builds up in the rocks along the fault until the strain is too great. At that point, the potential energy is released in the form of an earthquake.

While the majority of earthquakes do occur at plate boundaries, intraplate earthquakes can occur along fault zones in the interior of a plate. Large intraplate earthquakes usually have long recurrence intervals, which makes it difficult to estimate the associated risk.

Seismic Waves

Seismic waves transmit tectonic energy through the earth at speeds of up to several miles per second. Seismic waves produce ground motion on the earth's surface that may damage buildings, trees, cars, roads, and other structures. Soil properties, local geological features, and other factors play a role in attenuating or amplifying seismic waves at a given location.

There are several types of seismic waves. Body waves travel through the earth, while surface waves travel along its surface. The two types of body waves that are generated by an earthquake are primary and secondary waves, also known as P waves and S waves, respectively. P waves are fast and capable of traveling through both solids and liquids. These waves exhibit an alternating compression-dilatation motion in the direction of wave propagation. S waves are slower and travel only through solid material. These waves produce a sideways-shearing motion perpendicular to the direction of wave propagation.

Surface waves, which are responsible for the majority of earthquake damage, include Love waves and Rayleigh waves. Love waves move horizontally, perpendicular to the direction of wave propagation. Rayleigh waves are slow waves that move in an elliptical, or rolling, motion. Note that wave amplitude, which is the height of an individual wave cycle, or the maximum displacement, decreases with increasing depth in the earth for these surface waves. The amplitude of a wave is one measure of its destructive potential.

In addition to amplitude, there are several ways to mathematically describe wave activity. The wave frequency is the number of wave cycles per second that pass a reference point. A wave's period is the elapsed time, in seconds, between peaks, or the time it takes one complete cycle of the wave to pass a reference point. The wavelength is the distance between repeating units of a propagating wave of a given frequency at some point in time.

Measuring Earthquake Magnitude and Intensity

The severity of an earthquake can be measured by the damage it inflicts on the earth's surface or by the energy released at its focus, which is where the rupture originates. Earthquake magnitude characterizes the total energy released by an earthquake, while earthquake intensity refers to the resulting level of ground shaking at a particular location and the observed effects of an earthquake on people, buildings, and other features. While the magnitude of an earthquake is a characteristic of the earthquake as a whole, intensity varies from place to place within a disturbed region.

An earthquake's intensity at different locations can be described semi-quantitatively using the Modified Mercalli Intensity (MMI) scale[3], which was developed in its original form in 1902 and is based on observations of shaking severity and its effects at different locations. The MMI at a particular location is based on human judgment and the observed post-event damage. Today, ground motion intensity can be directly measured using strong motion seismographs. The characteristics of ground motion intensity can be quantified by physical parameters such as peak ground acceleration (PGA) and spectral acceleration (Sa). Shaking intensity at a particular location depends not only on earthquake magnitude, but on the local surface geology and the proximity of the location to the earthquake source.

Magnitude is a measure of an earthquake's size. There are several types of earthquake magnitude, including moment magnitude (M_w), Richter magnitude (M_L), body-wave magnitude (M_b), and surface-wave magnitude (M_s). Magnitude scales are generally logarithmic in nature; that is, an increase of one point on a magnitude scale represents approximately a ten-fold increase in wave amplitude and a 30-fold increase in the amount of energy released during the earthquake. AIR models utilize the moment-magnitude scale, which is based on seismic moment. The seismic moment is defined as:

$M_0 = \mu AD$

where

μ = the shear modulus of elasticity

A = the rupture area

D = the average slip over the rupture area

The moment magnitude is related to the seismic moment according to

$M_w=(2/3) \log M_0 - 6.0$

where M_0 is in Nm.

[3] Please see http://earthquake.usgs.gov/learning/topics/mercalli.php for a more detailed description of this intensity scale.

The moment magnitude is considered superior to other magnitude scales because it is based on earthquake source parameters, rather than on a particular type of seismic wave, like the surface-wave magnitude or body-wave magnitude scales, or a particular type of instrument, such as the Richter magnitude scale. The type and amplitude of the seismic waves that reach an instrument and are recorded depends on earthquake magnitude, the radiation pattern of seismic waves due to different rupture mechanisms, and the complex structures along the propagation path of the seismic waves that are between the source and seismic stations. Different earthquakes can generate different types of seismic waves. Small earthquakes generate seismic waves with short periods while larger earthquakes can generate seismic waves with long to very long periods.

Most seismic waves will saturate beyond a certain magnitude; that is, wave amplitude will not increase beyond that magnitude. Therefore magnitude scales based on the amplitude of a particular type of seismic wave will also experience saturation. Moment magnitude does not have such limitations.

Paleoseismic and Geodetic Data

The modeling of earthquakes requires historical data. For large earthquakes, the catalog is complete further back in time because such events are more likely to have been observed and documented than smaller events. However, improvements in instrument sensitivity and coverage have led to increased recordings of smaller events. The completeness of the historical catalog is therefore a function of time and magnitude.

Paleoseismic and geodetic data are often used to augment instrumentally recorded earthquake catalogs to estimate current seismic hazard. Paleoseismology is the study of the location, timing, and size of prehistoric earthquakes. Prehistoric earthquakes are evidenced by offsets in geologic formations found in exhumed fault zones, signs of rapid uplift or subsidence near coastal areas, laterally offset stream valleys, and liquefaction artifacts, such as sand boils.

The geodetic measurement of fault slip rate is another source of information that is used to supplement historical data. The Global Positioning System (GPS) is now the most widely used technology to measure fault slip rates of crustal deformations in a region. The observed crustal deformation represents elastic strain accumulation in the crust. By calculating the rate at which elastic strain accumulates along a fault or seismic zone, estimates can be made as to how often large earthquakes may occur.

Geodetic data assists in estimating the frequency of large-magnitude earthquakes; for smaller events, the historical earthquake data tends to be more complete. For earthquakes above a given magnitude, which is region-dependent, geodetic and paleoseismic data become more reliable compared to historical earthquake data, as Figure 10 illustrates.

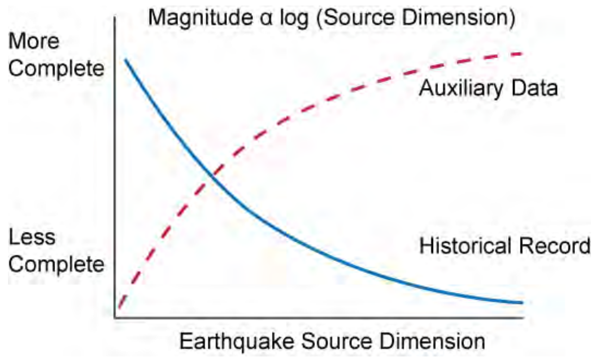

Figure 10. Completeness of Auxiliary and Historical Record Data, Based on Earthquake Source Dimension

The Gutenberg-Richter Relationship

The Gutenberg-Richter (GR) relationship (Figure 11) expresses the association between magnitude and the earthquake occurrence rate on a fault or in a given area, at or above each magnitude. The relationship can be used to provide a more complete picture of seismicity in regions where historical data is lacking, as it holds over a wide variety of magnitudes and locations.

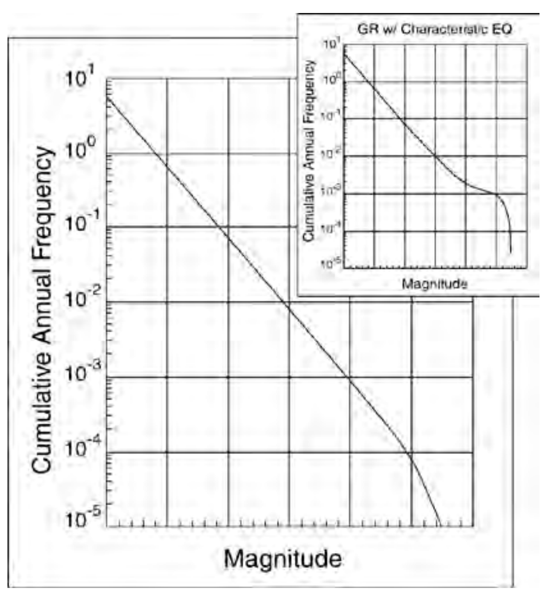

Figure 11. Sample Gutenberg-Richter Distribution

The GR relationship is parameterized by the a-value, which is the logarithm of the earthquake occurrence rate above some reference magnitude, and the b-value, which is the rate at which the logarithm of the cumulative-annual frequency decreases as the magnitude increases. Scientists usually truncate this relationship at a limiting magnitude above which the probability of an earthquake's occurrence becomes zero, as illustrated in Figure 11.

Note that the a-value is plotted as the y-intercept, and the b-value is represented by the slope of the line. The presence of large-magnitude characteristic earthquakes modifies the shape of the magnitude-frequency distribution.

Historical seismicity data, paleoseismic data, and geodetic slip-rate data are used to estimate the upper-bound magnitude of the GR distribution.

Characteristic Earthquakes

The characteristic earthquake concept states that active faults tend to generate earthquakes of about the same magnitude at regular time intervals. This concept is used to simulate seismic activity along active faults. In order to model seismicity using the characteristic earthquake method, the earthquake magnitude and return period must be defined. Magnitude can be estimated from paleoseismic data, historical data, and the length of the fault. The return period is estimated from paleoseismic data, fault slip rates, or seismic-moment rates as estimated from fault slip rates.

2.2 United States Earthquake Risk

Throughout the continental United States, earthquakes are generated along the plate interfaces, within plate slabs, and along crustal faults in the middle of the plates. All parts of the country experience low-intensity tremors year-round, and even destructive earthquakes are not limited to the west coast. Each century has seen one or more large-magnitude earthquakes strike inland regions as well as the west coast, and 39 states are associated with earthquake risk.

The hazard due to earthquakes in the continental United States is largely associated with California, where they pose a continual threat. The high seismic activity in this area is due to the on-land boundary between the Pacific and North American plates, which is located along California's coast. Farther north along the west coast, in the Cascadia region, the Juan de Fuca plate subducts under the North American plate and this activity has generated large damaging earthquakes in the Pacific Northwest, although not as frequently as in California.

Across the Rocky Mountains, in the central and eastern United States, the hazard drops significantly, however notable earthquakes have occurred in this part of the country. Earthquakes in this region are not as frequent as on the west coast, but the geological conditions in the central and eastern regions cause earthquakes of a given magnitude to affect a much larger area than earthquakes of the same magnitude that strike the west coast.

Figure 12 illustrates the historical seismicity of the continental United States.

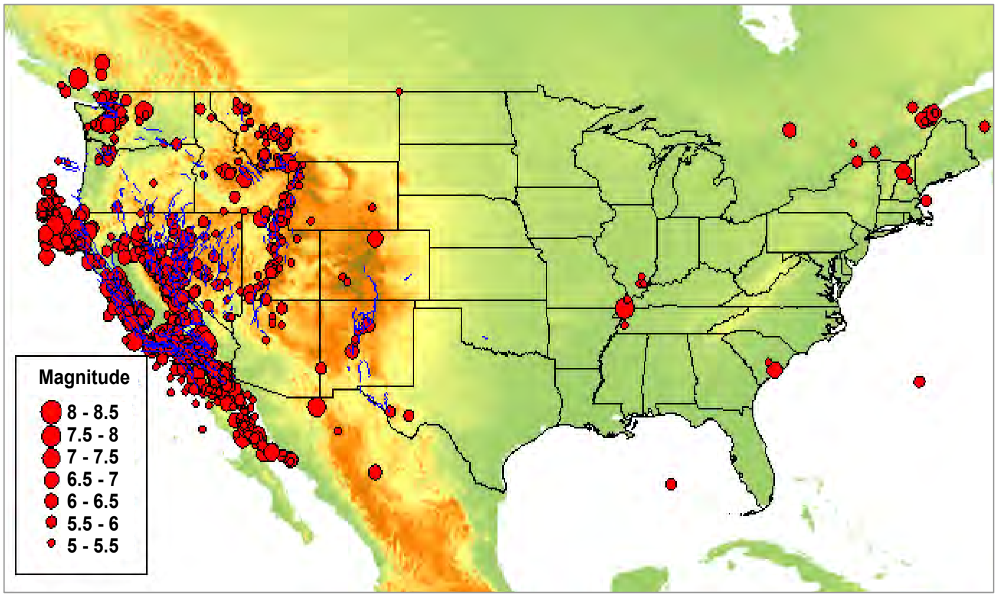

Figure 12. Historical Seismicity and Faults in the Continental United States ($M_W \geq 5.0$)

The seismically active areas in the continental United States are generally distributed among several states, with the highest exposure concentrated along the west coast. California, in particular, has a high exposure due the large and complex fault system, of which the major contributor is the San Andreas fault, as well as other major faults that are part of the San Andreas system. This part of California is also highly populated, with the major cities located along the coastline.

Oregon and Washington also have their highest populations located near the coast. The cities in this area have experienced fewer earthquakes than those in California, but the area is exposed to very large and damaging events due to the massive earthquakes that can be generated from the subducting Juan de Fuca plate. The activity from the plate motion is not limited to the west coast, however. A significant amount of deformation caused by the west coast plate activity affects much of the western interior and has been known to reach areas all the way to the eastern front of the Rocky Mountains.

The central and eastern regions of the country have far fewer earthquakes than the west, but it does have areas with earthquake risk due to intraplate deformation. In the central United States, there is abundant evidence of earthquakes in the Mississippi, Ohio, and Wabash River valleys. Three of the largest historical earthquakes known to strike the continental United States occurred in the winter of 1811–1812 along the New Madrid seismic zone.

In the northeastern and southeastern parts of the nation the earthquake risk is relatively low; however there are notable exceptions including the magnitude 7.3 earthquake that shook Charleston, South Carolina, in 1886, and the magnitude 6.0 earthquake that struck Cape Ann, Massachusetts, in 1755.

California

Earthquakes in the continental United States are mostly associated with the state of California, with good reason. Every year, California experiences approximately 500 earthquakes that are large enough to be felt. Earthquakes pose a continual major threat for the state's 36 million residents, most of whom live along the west coast in some of the most seismically active areas of the region.

California is the site of the on-land boundary between the Pacific and North American plates, which contains a complex system of faults. The right lateral strike-slip motion between the two plates occurs in California at a rate of about 33-37 mm/year, with the Pacific plate (west of the boundary) moving northwest, and the North American (east of the boundary) plate moving southeast. About 70 percent of the slippage is carried along the San Andreas fault, which runs about 1,300 kilometers (808 miles) in length. The fault system also includes a number of major faults running parallel to the San Andreas, such as the Calaveras, Hayward– Rodgers Creek, San Jacinto, and Elsinore faults.

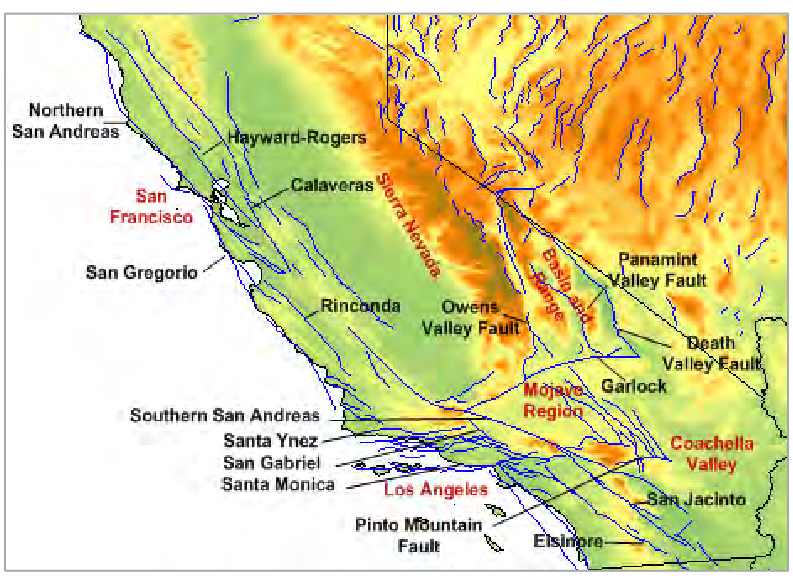

Figure 13. Some of the Major Faults in California

A lower slip rate of about 8-10 mm/year is found near the north part of the Coachella Valley, in southern California, where some of the right-lateral shear from the Pacific-North American plate boundary leaves the San Andreas fault. This shear continues along right-lateral faults across the Mojave Desert and along the east side of the Sierra Nevada. In California's Basin and Range province, right-lateral faults, including the Death Valley fault system, also accommodate approximately 8 mm/year of right-lateral shear, which is consistent with geodetic deformation rates in the area.

Eastern California – Nevada

A large part of western Nevada is affected by the eastern California shear zone, which runs northwest from the Gulf of California. The movement in this zone is about 10 to 12 mm/year, or about 25 percent of the total movement of the North American plate. Between this shear zone and the San Andreas area are the Sierra Nevada mountains, which move along with the plate that lies under them.

The central Nevada seismic zone, which adjoins seismic zones in southern California, was defined during a series of earthquakes that occurred between 1915 and 1954. The sequence started in October of 1915 when an earthquake of magnitude 7.1 struck Pleasant Valley. In 1932, Cedar Mountain was struck by a magnitude 7.3 shock, which was followed in 1934 by another shock of magnitude 6.5 at Excelsior Mountain. The final earthquakes in the sequence occurred in 1954, when the Carson Sink and Dixie Valley were struck by four earthquakes with magnitudes ranging between 6.6 and 7.1.

Southern Nevada contains a broad seismic area in the west-east direction that reaches from eastern California into Utah. Seismic activity has been observed or recorded in the Pahranagat shear zone and the Caliente region as well as the Goldfield region in the southwestern part of the state. In 1988, two earthquakes of magnitude 3.7 occurred in the Boulder City-Lake Mead area, possibly due to the Mead slope fault. Earthquakes have also struck Las Vegas; in November, 1989, and February, 2001, two relatively small earthquakes with magnitudes around 3.5 were widely felt in the Las Vegas area.

Cascadia Subduction Zone

The areas in the continental United States that are most affected by the Cascadia Subduction zone are the Pacific Northwest (Washington, Oregon, and Idaho) and areas of northern California.

The earthquakes in this zone can be extremely powerful, with magnitudes of 8.0 and higher. They can also be deep, and the Cascadia subduction zone has seen earthquakes as deep as 35 kilometers (22 miles). Deep earthquakes have ground motion characteristics that differ from shallower earthquakes, and generally don't produce surface waves as readily as shallow ones.

Figure 14. The Pacific, Juan de Fuca, and North American Plates in the Cascadia Subduction Zone

In January of 1700, an extremely powerful earthquake of magnitude 9.0 struck the Cascadia region, which extends 1,200 kilometers (746 miles) along the west coast from Cape Mendocino, California, through Oregon and Washington, up to Vancouver Island, British Columbia. This earthquake, which is believed to be the largest to have ever occurred in the continental United States, triggered a tsunami that traveled from the American coast to Japan, where it damaged several coastal villages. It was caused by tectonic stresses due to the subduction of the Juan de Fuca plate beneath the North American plate at a rate of about 40 mm/year.

This zone was also the site of three earthquakes with magnitudes of 7.0 and higher, which struck California's northern coast during the nineteenth century. In November, 1873, a magnitude 7.3 earthquake occurred along the coast near the California-Oregon border. In May, 1878, this same area was the site of an earthquake with a magnitude exceeding 7.0, located about 75 kilometers (47 miles) offshore near the Mendocino fault. Several earthquakes in the Puget Sound area, including ones in the city of Seattle, have cause heavy damage including major events in 1949, 1965, and most recently in 2001.

The Intermountain United States

The Intermountain United States comprises Nevada, Arizona, Utah, Montana, New Mexico, Colorado, and Wyoming. It includes the Basin and Range province (in eastern California and Nevada), the Colorado Plateau, the Rocky Mountains, and the Great Plains. The area is the site of the Intermountain Seismic Belt (ISB), which runs from northwestern Montana through Wyoming, Idaho and Utah, and further into southern Nevada and northern Arizona. Other major seismic zones in the Intermountain region include the Sierra Nevada-Great Basin zone; the central Nevada seismic zone; and the Rio Grande rift.

The ISB includes several fault zones including the Madison and Hebgen faults in Wyoming near Yellowstone National Park and, at the center of the ISB, the Wasatch fault zone in Utah. The Wasatch fault is at the base of the Wasatch mountains, which run along the eastern edge of Ogden, Salt Lake, and Provo, which are the major cities in Utah and home to about 75 percent of the state's population.

Since 1900, the ISB has been the site of 50 earthquakes with magnitudes between 5.5 and 7.5. The two largest earthquakes on record are a magnitude 7.5 earthquake, which struck Hebgen Lake, Montana, in 1959, and a magnitude 7.3 event at Borah Peak, Idaho, in 1983. Most of the earthquakes in this area are shallow, occurring at depths less than 20 kilometers (12 miles).

The Rio Grande rift extends from southern New Mexico northward to central Colorado. It includes the cities of Santa Fe and Albuquerque, where most of New Mexico's population is located. The area near the town of Socorro experienced quite a bit of earthquake activity during the nineteenth century, when a series of 22 shocks struck the area between 1849 and 1850. Socorro also experienced the largest earthquake observed in this region, a magnitude 6.0 shock that struck the area in November, 1906.

Central United States

The central United States is in the stable craton, which stretches from areas east of Denver, Colorado, across the Midwest. Earthquakes do occur in the area however, and when they do, the seismic waves propagate more efficiently due to the geology of the area. In the stable interior, the lithosphere is cooler and thicker than in the western United States, allowing ground motion to travel over a larger distance than on the west coast.

Some areas in the central United States show evidence of significant seismic activity in the past. These include southern Oklahoma, where paleoliquefaction features indicate that two large earthquakes of magnitude 7.0 occurred during the past 3,000 years along the Meers fault. Evidence along the Cheraw fault in southeastern Colorado indicates that earthquakes of a similar magnitude have occurred in that region over the past 10,000 years. More recently, over the past 150 years, eastern Kansas and Nebraska have experienced two earthquakes of magnitude 5.0.

Several times during the past century, moderate earthquakes have been widely felt in the Wabash Valley seismic zone along the southern border of Illinois and Indiana. Throughout the region, between 150 and 200 earthquakes are recorded annually although most are too small to be felt. Liquefaction features in the area indicate seismic activity, including earthquakes with magnitudes of 6.5 to 7.5 with recurrence periods of a few thousand years.

The New Madrid Seismic Zone

An area of great interest is the New Madrid seismic zone, due to the catastrophic earthquake cluster of 1811–1812, which ruptured the Reelfoot fault. The zone is named after the town of New Madrid, Missouri, which was the closest settlement to the epicenter of the 1811–1812 events. Both the New Madrid and the nearby Wabash Valley zones (Figure 15) are located in the central Mississippi Valley and encompass an area that includes northeastern Arkansas, southeastern Missouri, western Tennessee, western Kentucky, and southern Illinois. This area is not part of the stable craton but is instead included in the extended margin, which extends along the south and up the Atlantic coast.

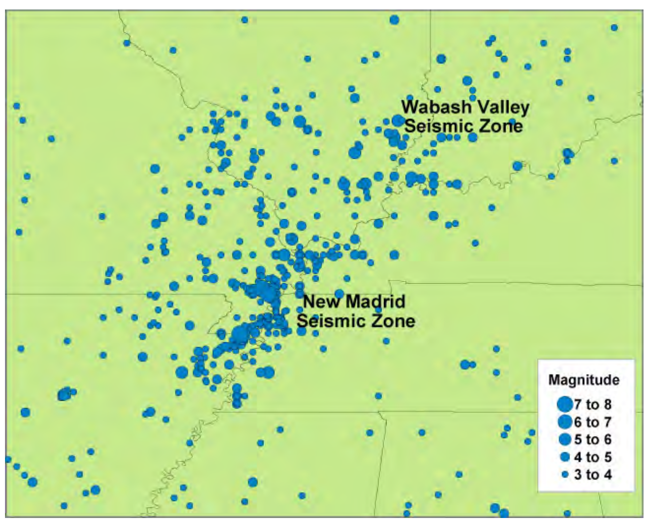

Figure 15. Historical Seismicity in the New Madrid and Wabash Valley Seismic Zones ($M_W \geq 3.0$)

The earthquakes of 1811–1812 occurred over a three-month period, and included three extremely powerful shocks with magnitudes well over 7.0. These earthquakes affected the landscape profoundly; it changed the topography over a very large area of about 600,000 square kilometers (232,000 square miles). The land was raised and sunk in areas. Fissures, sinks, sand blows, and large landslides occurred over a huge area of 78,000–129,000 square kilometers (30,000 – 49,800 square miles). There was, however, no surface rupturing.

Even after 1812 the area experienced hundreds of aftershocks, which continued for several years. Other large earthquakes have also struck the area since that time, including an event of magnitude 6.0, which occurred in January of 1843 and another of magnitude 6.2, which occurred in October of 1895.

The Southeastern United States

Evidence of significant earthquakes in the southeastern United States is provided by paleoliquefaction features in the Atlantic coastal plain. These are associated with nearly vertical faults that formed in the bedrock 220 million years ago, during the Triassic period, when the Atlantic Ocean opened.

Within this region, one of the areas of particular interest is the coastal plain of South Carolina. This is the site of the Middleton Place-Summerville seismic zone, which contains two faults: the deep Woodstock fault, which run northeast, and the shallower Ashley River fault, which runs northwest. Recently there has been little seismic activity in this area; however it is the site of a magnitude 7.3 earthquake, which struck Charleston in 1886.

Seismic activity is also found in northeastern Alabama, northwestern Georgia and eastern Tennessee, where the seismic zone runs parallel to the fold-and-thrust belt of the Appalachian Mountains. The earthquakes in this area generally do not have magnitudes exceeding 4.7, and have not been known to cause damage. There is also no evidence of prehistoric shocks although there is some indication of stress accumulating in the region. If any of the bedrock faults in this region show activity, it could be due to a weak lower crust or increased fluid pressure within the upper crust.

The mid-Atlantic and central Appalachian regions, including Maryland, have experienced some low-level tremors, but it is an area of very low earthquake risk. Maryland contains numerous faults, but none are known to be active.

The Northeastern United States

Similar to the New Madrid and Charleston areas, the northeastern United States has been the site of large intraplate earthquakes. They are rare when compared to the west coast; most earthquakes in the region have small magnitudes and are not widely felt. However, seismic activity is persistent, which indicates that some crustal deformation is occurring.

The most recent significant earthquake in the area occurred on September 25, 1998, when a magnitude 5.2 event struck Pymatuning Reservoir, Pennsylvania. In 1904, an earthquake with an intensity of VII (MMI scale) was recorded in Eastport, Maine. One of the most severe earthquakes known to occur in the northeast was the Cape Ann earthquake of 1755, which struck the Boston, Massachusetts area with a magnitude of 6.0 causing considerable damage.

The northeast is affected by the Charlevoix seismic zone in eastern Canada, also known as the Charlevoix-Kamouraska seismic zone, located along the St. Lawrence River, about 100 kilometers (62 miles) north of Quebec City. Since 1663 this area has experienced five earthquakes of magnitude 6.0 or greater. Remote sensing indicates strike-slip to reverse faulting on buried crustal faults, and crustal weakness combined with fluid pressure are believed to contribute to the earthquake activity.

2.3 Significant Historical Earthquakes in the United States

Six of the more significant earthquakes in U.S. history are described in this section. They are notable in terms of the long-term effects on the surrounding environment and the damage that was incurred. Major events, such as the 1994 Northridge, California earthquake can also have a permanent effect on building codes and insurance coverage.

New Madrid Region (1811–1812)

Between December 16, 1811, and March 15, 1812, a series of devastating earthquakes struck the interior of the continental United States. The series defined the New Madrid seismic zone, named after New Madrid, Missouri, which was the town closest to the epicenter of the earthquake sequence. During this time period, the area was shaken by over a hundred moderate to large earthquakes with magnitudes between 4.5 and 7.6.

Included in the earthquake sequence was a cluster of very large events: an earthquake with a magnitude of 7.2 on December 16, 1811 (followed by another shock of 7.0), another with a magnitude of 7.1 on January 23, 1812, and the largest with a magnitude of 7.7 on February 7, 1812. Although the first shock was reportedly extremely violent, the two aftershocks that struck six hours later were much more destructive.

Most of the destruction was done to the landscape, which still shows evidence of uprooted forests, massive landslides, sand blows, and fissures covering a very large area of about 600,000 square kilometers (232,000 square miles). Shaking was felt throughout much of the United States and even as far away as Quebec, over an area five times larger than the area affected by the 1906 San Francisco earthquake.

The earthquake generated huge waves along the Mississippi river, throwing boats onto the banks, which in turn collapsed back into the river. Elsewhere along the river, whole islands disappeared. According to records, the only life that was claimed was in New Madrid, due to falling buildings. However, damage to log cabins and chimneys occurred as far away as Ohio, Kentucky, Missouri, and Tennessee.

Charleston, South Carolina (1886)

On September 1, 1886, Charleston, South Carolina, was struck by the most damaging earthquake to occur in the southeastern United States. The earthquake had a magnitude of 7.3, making it one of the largest shocks on record for eastern North America. It damaged or destroyed most of the buildings in the city of Charleston and killed 60 people. Structural damage was reported as far away as central Alabama, Ohio, eastern Kentucky, Virginia, and West Virginia. Shaking was reported as far away as 1,000 kilometers (620 miles).

Craters and fissures from this earthquake were observed over an area of 1,300 square kilometers (500 square miles). Severe damage was done to 80 kilometers (50 miles) of railroad tracks and the tracks six kilometers (4 miles) northwest of Charleston formed S-shaped curves in places where they were formerly straight.

Sand overflows were widespread in the area, and formed craterlets as wide as 6.4 meters (21 feet). Some of these craterlets spewed water spouts as high as 4.5 to 6 meters (15-19 feet). Fissures one meter wide appeared along canals and stream banks. Wide cracks appeared along the banks of the Ashley River and as the banks collapsed, large trees were uprooted and carried into the river along with the sand.

In the town of Summerville, about 25 kilometers (15 miles) northwest of Charleston, many houses were damaged and displaced. Chimneys constructed independently of the houses had the portion above the rooflines break and fall to the ground. Many chimneys were crushed at the base and consequently sunk through the floors. This type of chimney damage, and the fact that multi-level structures remained standing, indicate that the predominant ground shaking was probably vertical.

Ground shaking from this earthquake was reported as far away as Boston, Massachusetts; Milwaukee, Wisconsin; Chicago, Illinois; Cuba; and Bermuda.

San Francisco, California (1906)

The magnitude 7.8 earthquake that struck San Francisco on April 18, 1906, remains one of the most devastating earthquakes in the history of California. It caused an estimated 3,000 deaths and USD 524 million in property loss (1906 dollar values), due to both shake damage and resulting fires. In San Francisco, direct damage from the earthquake was estimated at USD 20 million (1906); outside the city, it was estimated at USD 4 million (1906). Shaking was felt throughout California and in parts of Nevada and Oregon. In San Francisco, shaking was felt for about one minute from the main shock, which was followed by several aftershocks.

The earthquake created the longest fault rupture ever observed in the continental United States. The rupture extended 477 kilometers (296 miles) along the northern San Andreas fault, from northwest of San Juan Bautista to Point Arena, and from there the rupture continues further into the ocean. Horizontal displacement was observed in many areas with the largest at 6.4 meters (21 feet) found near Point Reyes Station in Marin County. The displacement caused by this earthquake, and the strain of the rupture, led to the elastic-rebound theory of earthquakes.

The earthquake devastated San Francisco, destroying or severely damaging structures throughout the city. The pavements buckled; houses of ordinary brick and frame construction were destroyed; sewers and water mains were broken; and streetcar tracks were torn and bent out of shape. The ground was torn and forced into ridges and trees were knocked over. Pipelines were broken, and roads were impassable, shutting off water supply to the city, which in turn made it impossible to fight the fires that ignited due to overturned stoves and broken gas lines. At least 50-60 fires burned the city for four days; the percentage of the total damage attributed to fire is estimated to be between 80% and 90%.

The ground shaking from this earthquake was at destructive intensities as far away as 600 kilometers (373 miles) from the fault. Based on geological effects, the maximum MMI appears to be XI although based on building and infrastructural damage, the maximum MMI was IX.

Loma Prieta, California (1989)

On October 17, 1989, a magnitude 6.9 earthquake struck Nisene Marks State Park in the Santa Cruz Mountains, rupturing a section of the San Andreas fault about 100 kilometers (62 miles) south of San Francisco. This earthquake was the largest to occur along the San Andreas fault since the 1906 earthquake in San Francisco, however the rupture was much smaller. This earthquake however caused 63 deaths, nearly 4,000 injuries, and an estimated USD 6 billion (1989 dollar values) in property damage.

Severe damage occurred throughout the greater San Francisco-Oakland area. In Monterey Bay, liquefaction broke underground pipes and caused significant and widespread damage to many structures including buildings, bridges, highways, and port facilities. Levees and airport runways were also heavily damaged. Liquefaction also occurred in San Francisco's Marina District where the soil conditions (loose sandy fills above deep soil deposits) amplified the ground shaking. In San Francisco and Oakland, reinforced concrete viaducts collapsed, resulting in heavy damage to U.S Highway 101 and Interstate 280 in San Francisco, and to Interstate 880 in Oakland. Traffic was also disrupted for many weeks due to landslides near the earthquake's epicenter in the Santa Cruz Mountains.

Several fires broke out, particularly in the Marina District of San Francisco, and also in Santa Cruz. Several homes were burned down completely and many buildings, including some fire stations, suffered severe fire damage.

However engineered buildings, even those near the epicenter, withstood the ground shaking quite well. Hospitals sustained only minor damage and operations were not interrupted. Only five schools were severely affected, sustaining an estimated USD 81 million in damages. The worst damage was to unreinforced concrete structures with wood frame roofs, and floors supported by unreinforced brick walls. The Pacific Garden Mall in Santa Cruz, which consisted of unreinforced masonry buildings, sustained a great deal of damage.

The first day after the main shock, 51 aftershocks of magnitude 3.0 and higher took place and 16 occurred the following day. Over the next three weeks after the main earthquake, 87 aftershocks with magnitudes 3.0 and higher took place in the region. Considering the earthquake's magnitude, this is fewer aftershocks than would be expected in the region.

The earthquake is sometimes referred to as the "World Series" earthquake, since it occurred at 5:04 p.m. during a World Series game taking place in San Francisco, and consequently became the first earthquake to be broadcast live on television. It is believed that rush hour traffic was much lighter than usual that day due to people leaving work early or staying in town for the game (both teams were from the area), and that the death toll might have been much higher otherwise.

Figure 16 compares the Loma Prieta rupture along the San Andreas fault to the rupture caused by the 1906 San Francisco earthquake.

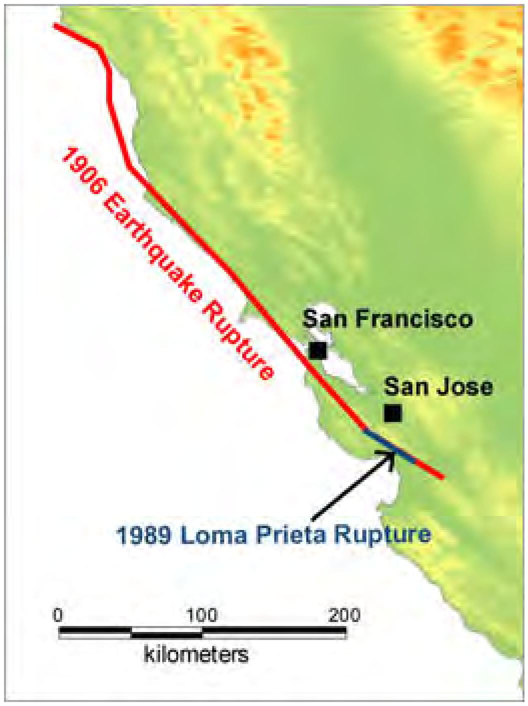

Figure 16. 1906 Rupture of the San Andreas Fault compared to the 1989 Loma Prieta Rupture

Northridge, California (1994)

On January 17, 1994, once of the most significant earthquakes to occur in California shook the Northridge area. This earthquake had a magnitude of 6.7 and the devastation was profound. It claimed the lives of 60 people, injured over 7,000, and left 20,000 homeless. Throughout the greater Los Angeles area, across several counties, more than 40,000 buildings and structures, including Anaheim stadium, were heavily damaged.

The earthquake affected several freeways when the columns supporting the overpasses collapsed, causing those portions of the freeway to fall onto the freeway beneath. Collapsed overpasses occurred on the Santa Monica, Simi Valley, and the Golden State freeways, among others.

Most of the buildings that were damaged were multi-story wood frame buildings, especially those with a "soft" ground floor, (e.g., those with parking areas or other large open spaces on the ground floor). Unreinforced masonry buildings and houses on steep slopes were also heavily damaged. Eleven hospitals had to be shut down due to heavy damage, which caused other hospitals to be overburdened with incoming patients injured from the earthquake. It should be noted that school buildings, for which earthquake reinforcement is mandatory, survived fairly well.

This earthquake triggered several fires, mostly in the San Fernando Valley but also in Malibu and Venice. As houses shifted, gas pipes broke and water heaters toppled over, causing fires to break out. In the San Fernando Valley, fires broke out amid floods due to rupturing of both gas pipes and water mains.

The earthquake was felt throughout southern California and as far away as Las Vegas, Nevada. Shaking was also reported in Richfield, Utah, and Ensenada, Mexico. The largest recorded acceleration of 1.8 g occurred at Tarzana, about seven kilometers (four miles) south of the epicenter, and several other sites recorded maximum accelerations exceeding 1.0 g. In the mountains, roads were blocked due to rockslides and ground cracks appeared in the Potrero Canyon and at Granada Hills. The maximum uplift of about 15 centimeters (6 inches) was observed in the Santa Susana Mountains.

The Northridge earthquake remains the costliest in recent U.S. history, with estimates for property damage at over USD 15 billion (1994). Due to the overwhelming cost of this earthquake, many insurers stopped offering earthquake insurance, or only offered it at a restricted level. In response, the California Earthquake Authority was created by the California Legislature to make minimal earthquake insurance available on a broad scale.

Nisqually, Washington (2001)

On February 28, 2001, a magnitude 6.8 earthquake shook the Puget Sound area for 40 seconds. The epicenter was located about 56 kilometers (35 miles) south of Seattle, in the same area as a magnitude 7.1 earthquake that occurred in April of 1949. It is attributed to tensional (normal) faulting in Juan de Fuca Plate, caused by the plate bending as it subducts under the North American plate.

The earthquake caused about 400 injuries along with major damage to several structures in Seattle, Tacoma, and Olympia. The maximum ground-shaking intensity occurred in Olympia and in the Pioneer Square area of Seattle, while the maximum recorded acceleration of 0.3 g was recorded at Seward Park in Seattle. Ground shaking was reported in central Oregon and in Vancouver, British Columbia. Shaking also occurred as far east as northwestern Montana and in Salt Lake City, Utah.

Landslides, liquefaction, and sand boils were witnessed south of Seattle, in the suburb of Renton, and also in Tacoma and Olympia. Most of the structural damage was to buildings that were near the epicenter, although there was significant damage to unreinforced concrete or masonry buildings in Pioneer Square and areas south of Seattle. At Seattle-Tacoma International Airport, the air traffic control tower was damaged along with several runways. (A new air traffic control tower was built with earthquake-resistant construction.)

Several highways and bridges were significantly damaged. In Olympia, the Fourth Avenue Bridge was nearly destroyed and had to be torn down completely and rebuilt. Just northwest of Olympia, U.S. Highway 101 buckled in several places and a mudslide blocked State Route 3 northeast of Shelton. The Alaskan Way Viaduct, which runs along the Seattle waterfront, also sustained a good deal of damage.

Mineral, Virginia (2011)

On August 23, 2011, at 1:51 pm, the largest earthquake in over a century occurred near the small town of Mineral, Virginia, about 40 miles northwest of Richmond and 83 miles southwest of Washington, D.C. The earthquake, which was only 3.7 miles deep, had a magnitude of 5.8 and was felt as far north as Toronto and as far south as North Carolina.

The dense, hard rock of the eastern United States allowed the seismic energy from this strong temblor to cause damage in the nation's capital where a spire fell off of the National Cathedral and cracks appeared in several buildings and in the Washington Monument. A roof and a chimney at a Washington D.C. school were damaged and some broken glass was reported. The government buildings, including parts of the Pentagon, the White House, and the Capitol were evacuated. Flights from Reagan National Airport were suspended and cellular phone service was knocked out or jammed for many people. In New York City, the federal courthouse was evacuated and the streets became jammed as other people streamed out of office buildings.

Damage was quite apparent in Richmond where many buildings suffered cracks and broken glass. Broken glass was also widespread in Mineral, where contents were strewn across floors of homes and grocery stores. The nearby North Anna Power Station lost power, and Dominion Power shut down two of its nuclear reactors.

3 Event Generation

The AIR Earthquake Model for the United States captures the effects of ground shaking, liquefaction, and fire damage on insured properties. The hazard component of the model is based on the 2008 United States Geological Survey (USGS) national earthquake hazard model, which is described in USGS Open-File Report 2008-1128, *Documentation for the 2008 Update of the United States National Seismic Hazard Maps*. The details of this update are the result of a collaborative effort by the scientific community at several USGS workshops held around the country, which included active participation by AIR's scientists and engineers.

As part of their report, the USGS released a large number of documents and data that support the revision of their seismic hazard maps. New information from this research was provided on the magnitude-frequency distribution of earthquakes along faults and subduction zones across the continental United States. They also provided reports on an enhanced seismicity study and on the shallow and deep background seismicity at grid points uniformly distributed across the country. To account for both parametric and model uncertainties, the USGS makes extensive use of logic trees.

The current AIR model is based on an extensive review of the latest USGS model, including reviews of the magnitude-frequency distributions for faults and subduction zones in the western United States, the special seismic zones in the central and eastern United States, and the background seismicity. To construct the stochastic catalog, AIR seismologists formulated a procedure that captures the details of the USGS model, on both regional and local scales, and translates that information into catalog-based earthquake scenarios.

The procedure includes detailed reviews of the USGS logic trees on seismicity and ground motion. These logic trees allow the AIR model to capture the epistemic uncertainties on rupture scenarios, fault geometry and locations, magnitudes, faulting mechanisms, and the rupture orientation of the background seismicity that are compatible with the information given by the USGS report.

3.1 Modeled Earthquake Variables

Each event in the model's stochastic catalog(s) is associated with an epicenter, magnitude, rupture length and width, azimuth, dip, dip azimuth, depth, and rupture mechanism.

Epicenter

The epicenter of an earthquake is the location on the earth's surface directly above the point of initial rupture. Understanding the spatial distribution of earthquake epicenters is greatly facilitated when the faults are visible on the surface. In the case of blind faults, their location must be inferred from the seismic activity of the area or by subsurface-sounding techniques; many faults remain undiscovered, however.

The background seismicity component of the AIR Earthquake Model for the United States allows simulated earthquakes to occur anywhere within a seismic source zone to accommodate the uncertainty surrounding the locations of past events. While the distribution of epicenters used in the model generally reflects the historical distribution, smoothing techniques appropriate to each region allow simulated earthquakes to occur where none have been observed in the past.

The modeling of seismicity on subduction zones and faults is based on the epicentral locations of historical and instrumentally-recorded earthquakes, paleoseismic data and GPS data.

Magnitude

Magnitude, a measure of the energy released during an earthquake, is a useful way to compare seismic events. As described in Section 2, a variety of magnitude scales have been used to describe earthquakes. The AIR Earthquake Model for the United States utilizes the moment magnitude scale, M_w. Moment magnitude is a more quantitative and therefore objective measure than the Richter scale, and is applicable over a wider range of ground motions and geographical locations.

Focal Depth

The focal depth is the depth at which a rupture originates. Because seismic waves are attenuated as they travel through the earth, deeper earthquakes of a given magnitude typically cause less damage than those that erupt closer to the surface. Event magnitude and the thickness of the upper layer of the earth's crust shape the distribution parameters that govern focal depth. Crustal thickness can vary considerably across the United States.

Rupture Length

Rupture length is the span of the fault that ruptures during an earthquake. In the AIR Earthquake Model for the United States, rupture length is modeled as a function of the magnitude of the event, with the relationship between rupture length and magnitude determined through empirical regression analysis.

Rupture Azimuth and Dip Angle

Rupture-azimuth and dip angle are parameters that define the orientation of a fault. The rupture azimuth is the angle between true north and the line connecting the rupture plane and the surface of the earth, measured clockwise from north. By convention, the dip azimuth is 90 degrees clockwise of the rupture azimuth. Because energy is distributed along the rupture, a fault's spatial orientation is important for damage estimation.

For earthquakes in each seismic source zone, a preferred azimuth is defined with some range of variation. For characteristic earthquakes, the rupture azimuths are aligned with the fault orientations.

Fault Rupture Mechanism

In the AIR Earthquake Model for the United States, the rupture mechanisms for faults vary widely across the country. See Section 3.4 for a discussion of the fault sources used in different regions.

3.2 Domain of the AIR Earthquake Model for the United States

The region that is covered by the AIR Earthquake Model for the United States comprises the 48 conterminous states and the District of Columbia. Seismic events generated in the model cover a region well beyond the boundaries of the United States to include parts of Canada, Mexico and off-shore subduction zones. The region covers an area that extends from 64° to 127° west longitude and from 24° to 51° north latitude. The model domain is shown in Figure 17.

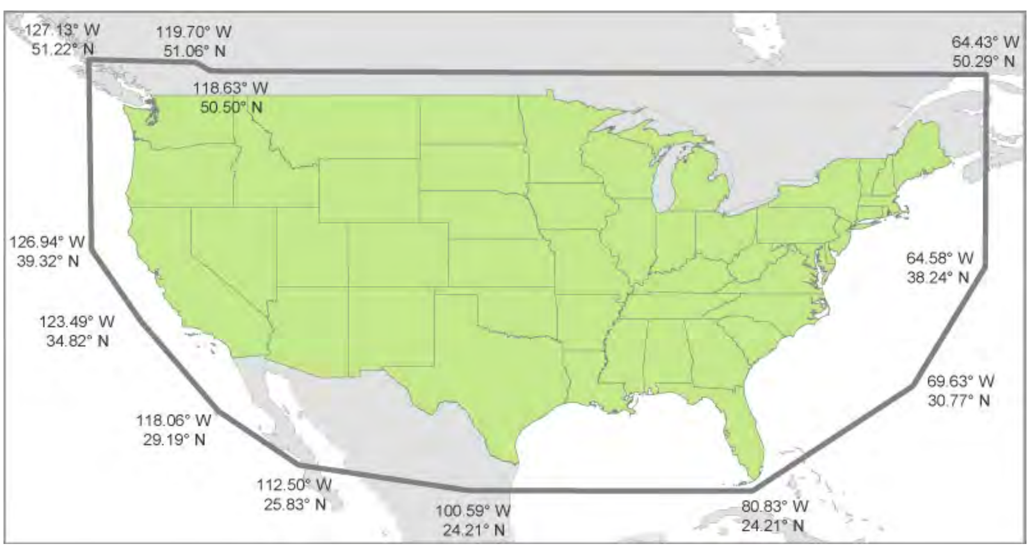

Figure 17. United States Earthquake Model Domain

3.3 Regional Seismicity in the Continental United States

The AIR model makes use of known faults, subduction zones, and special seismic zones, as well as geodetically derived source zones that are identified in the USGS report. In addition, the AIR model uses the USGS smoothed-gridded seismicity information to account for the regional seismicity that is not captured by faults. Details of each of these seismic sources is discussed in the sections that follow.

3.4 Fault Sources

In the AIR Earthquake Model for the United States, the seismicity of the country's faults and the Cascadia subduction zone is based on the information provided in the USGS report. For their 2008 model update, the USGS conducted a comprehensive review of all available information on faults within the continental United States.

This review resulted in the formulation of a very elaborate logic tree that captures various types of parametric and model uncertainties, including uncertainties in the magnitudes of the characteristic earthquakes on faults, and uncertainties for cascading fault scenarios. The recurrence rates for characteristic earthquakes on faults are based on the integration of the paleoseismic, geodetic, and seismic data, depending on the availability of data for each fault.

AIR has developed comparable fault sources by extracting an exhaustive sampling of the USGS fault rates, based on the magnitude-frequency distributions. Using the USGS seismicity information for faults, fault segments, and cascading scenarios, provided in the form of logic trees, AIR constructed a magnitude-frequency distribution for each fault. This magnitude-frequency distribution captures the details of the USGS logic-tree uncertainty for the seismicity for each fault. The magnitude-frequency distributions are used to generate AIR's stochastic catalogs.

Figure 18 shows the subduction zones and crustal faults for the west coast and intermountain seismic belt.

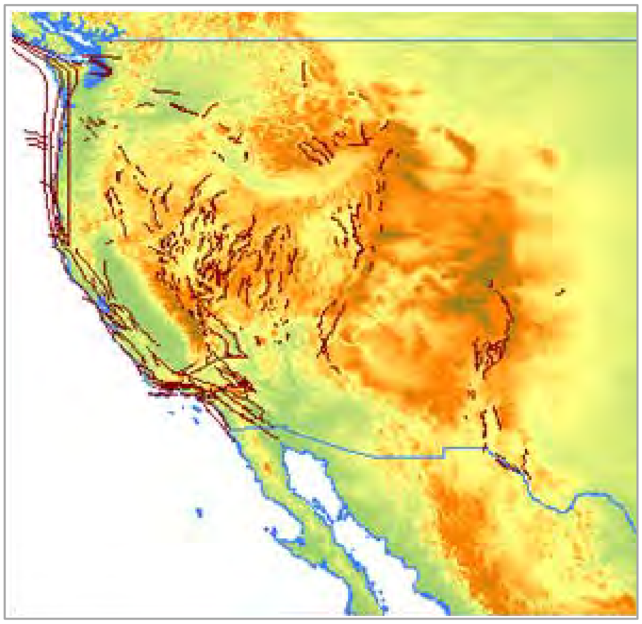

Figure 18. Subduction Zones and Crustal Faults in the Western United States

California

For the state of California, two types of fault sources are identified by the USGS: type-A and type-B faults. Type-A faults are extensively studied and have enough information on the location, timing, and (in some cases) slip rates for previous earthquakes to be used for stress-renewal recurrence time-dependent analysis. In the Uniform California Earthquake Rupture Forecast (UCERF2)[4], there are six type-A faults: San Andreas, San Jacinto, Elsinore, Garlock, Hayward-Rodgers Creek, and Calaveras. The models used for these faults include characteristic earthquakes on specific segments, multi-segment ruptures, and earthquakes that rupture only part of a specific segment.

The San Andreas fault is the most extensively studied fault in the world, and major faults that are part of the greater San Andreas fault system are also considered type-A, such as the Hayward-Rodgers Creek, San Jacinto, Garlock, and Elsinore faults.

The AIR model includes 136 single and cascading scenarios for type-A faults. Type-B faults have slip-rate estimates, but the data on the distribution and timing of previous events are inadequate to model these faults with stress-renewal probabilities. There are 416 type-B faults included in the AIR model.

[4] UCERF2 was released by the 2007 Working Group on California Earthquake Probabilities. See Section 3.5 for more information.

Additionally, the USGS defines a number of areal special seismic zones to capture the seismicity of certain regions that cannot be adequately modeled by faults or background seismicity. The seismicity of these zones are discussed in the Special Zones section below.

Figure 19 below illustrates some of the details of the Peninsula Segment of the San Andreas fault.

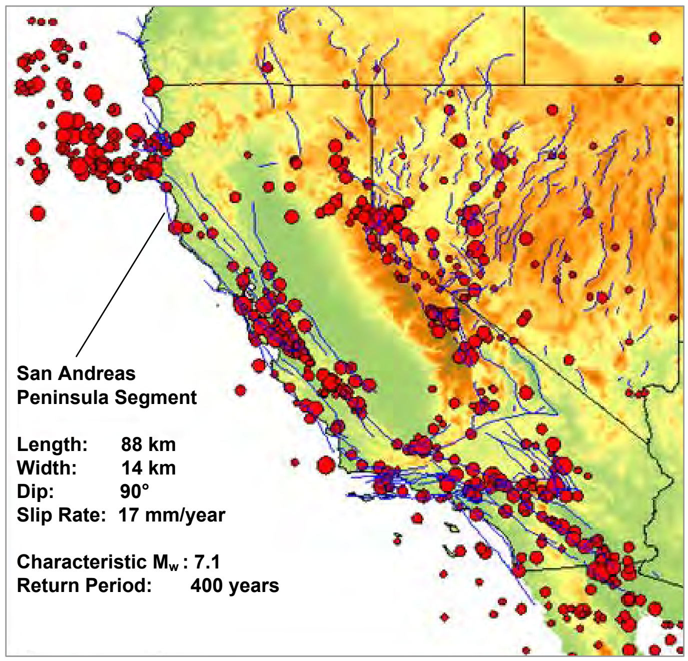

Figure 19: The San Andreas Peninsula Segment

The Cascadia Fault Sources

In the Pacific Northwest (Washington, Oregon, and Idaho) both crustal faults and subduction zones drive the hazard, giving this region a unique seismic setting when compared to the rest of the country. The crustal faults include the South Whidbey Island fault, the Lake Creek-Boundary Creek fault, the Stonewall anticline, and the Boundary Creek fault.

The Cascadia subduction zone extends about 1,200 kilometers from Vancouver Island in British Columbia to Cape Mendocino in California. At these areas, the Explorer, Juan De Fuca, and Gorda plates subduct under the North American plate at about 40 mm/year. Coastal subsidence and tsunami deposits indicate that the recurrence rate of extremely large earthquakes (M8.8–M9.2) in this region is about 500 years.

The rupture models for the Cascadia subduction zone were developed based on thermal models and analogs of shallow-dipping subduction zones used by the

USGS. The ruptures extend through different depth ranges that are typical of the elastic and transitional zones of the earth's crust, and extend down to a depth of 30 kilometers. The AIR model adopts the complex geometry for the Cascadia zone by implementing four different scenarios developed by the USGS that have varied width and dipping angles from north to south.

Figure 20 shows the Cascadia rupture zone faults. In this figure, the "top" (pink line) is the base of the elastic zone, the "middle" (red line) is the midpoint of the transition zone, the "bottom" (brown line) is the base of the transition zone, and the "base" (cyan line) is the base for the model that assumes the ruptures extend to a depth of about 30 km.

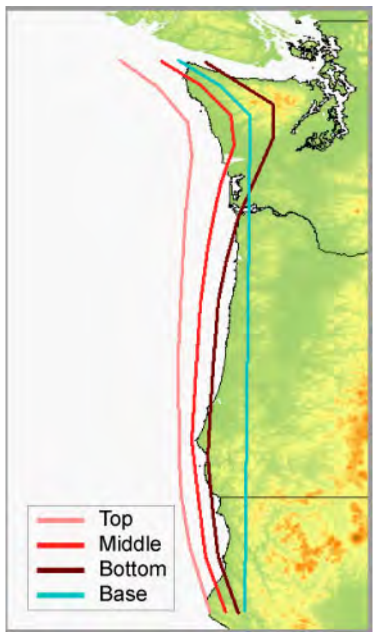

Figure 20. The Cascadia Subduction Zone Fault Model

The USGS model considers two scenarios for the interface earthquakes in the Cascadia subduction zone: one scenario assumes that the entire subduction zone ruptures in a megathrust M9.0 (± 0.2) earthquake; the other scenario assumes that different sections of the subduction zone rupture in smaller M8.0 – 8.8 earthquakes. In both scenarios, the recurrence time for the rupture of the subduction zone, at any point along the zone, is assumed to be 500 years. During the last few years, the M9.0 scenario has been gaining more credibility, and in the latest USGS maps the probability of an M8.8–M9.2 scenario has increased from 0.5, used in 2002, to 0.67.

Intermountain West

The fault sources for the Intermountain West include nearly 300 faults, although this large and diverse area contains thousands of older faults and has a very long history of seismic activity. The AIR modeled faults in the Intermountain West include all Quaternary faults that have documented slip rates (or sufficient data to calculate the slip rates) or rates of large earthquakes that caused permanent geological deformation. All faults with known Holocene surface faulting are included.

The model also takes multi-segment ruptures for some faults into consideration, such as those along Utah's Wasatch fault. For this fault, the model includes a characteristic earthquake of magnitude 7.4.

The New Madrid Seismic Zone

In the latest U.S. Hazard Maps the USGS conducted a major review of the New Madrid seismic zone (NMSZ) and accordingly introduced important changes to the formulation of the seismicity for this special zone, based on the earthquakes of 1811–1812. These changes included updating the spatial distribution of the NMSZ faulting scenario, dividing the NMSZ into three segments (southern, central, and northern), and then modifying the recurrence intervals and magnitude distributions for each segment.

The precise location of the three New Madrid events is uncertain due to the uncertainty in the regional seismotectonic setting, and in the interpretation of data taken at the time of the 1811–1812 earthquakes. Therefore, to account for the spatial variability of future earthquakes in the area, the AIR model uses the process adopted by the USGS, which provides for five hypothetical fault traces. Figure 21 illustrates these fault traces and shows the probability of an earthquake being located along each trace, should one occur. The center trace shows a much higher probability (70%) of being the location of an event than the other four traces on either side.

After carefully reviewing the paleoliquefaction data, the USGS introduced two major changes for the recurrence model. First, for the entire zone, they introduced a 1,000-year rupture scenario with a 10% weighting factor. This reflects observations on the correlation between the changes in the meander patterns of the Mississippi River and large-magnitude earthquakes. The second change pertains to the northern segment, where the USGS assumed a longer recurrence rate of 750 years.

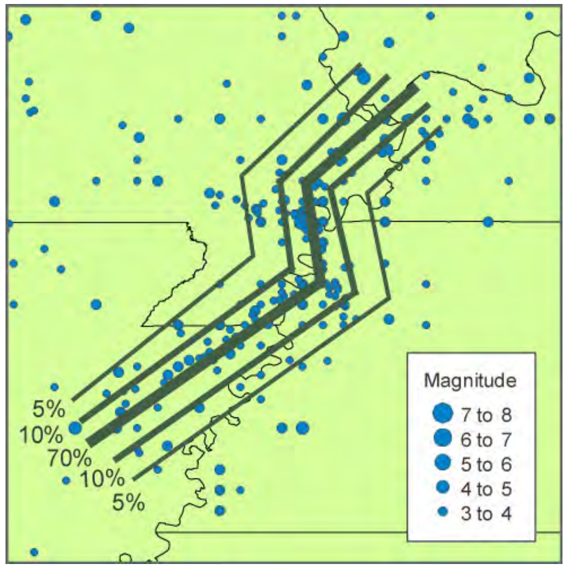

Figure 21. Spatial Variability in the New Madrid Seismic Zone using Five Parallel Fault Traces (USGS)

The USGS now considers temporal clustering for earthquakes on different segments of the NMSZ. This is based on the 1811–1812 events and on geological data, which shows evidence that prehistoric earthquakes on the Reelfoot fault typically occur in sequences of three large earthquakes similar to that observed in 1811–1812.

Accordingly, the USGS considers three scenarios for earthquakes occurring in the NMSZ. In one scenario, which has a 50% weighting factor, no clustering is considered. Under this scenario, the entire NMSZ would rupture in a single earthquake that extends along the entire fault zone.

In the second scenario, earthquake clustering is assumed; in this case, the NMSZ ruptures either in three separate, but temporally correlated, earthquakes on its southern, central, and northern segments, or in two separate, but temporally correlated, ruptures on the central and southern segments. For each segment, the USGS considers four different magnitude scenarios although for the northern segment they use a magnitude range that is lower by 0.2 units.

Figure 22 shows the logic tree used for the New Madrid seismic zone. The northern, central and southern segments are marked as N, C, and S, respectively.

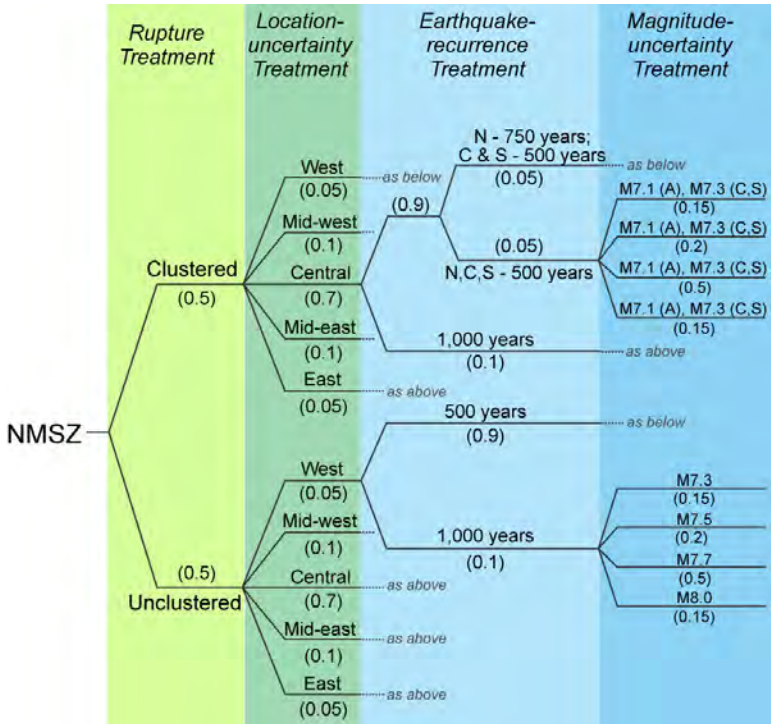

Figure 22. A Logic Tree Used to Capture Uncertainty for the New Madrid Seismic Zone

For the NMSZ, the AIR earthquake model closely follows the USGS model. However, given the number of branches of the logic tree, the number of permutations of magnitude-rate scenarios becomes so large (these include the variations on five rupture scenarios in the east-west direction, the three rupture segments for each scenario, four magnitude values for each segment, the distribution of the recurrence intervals, and the consideration for earthquake clustering on the different segments) that it cannot be fully captured by earthquake scenarios in a typical 100,000-year catalog.

Therefore, to capture this complexity in the AIR catalog, AIR seismologists first constructed an earthquake catalog containing *one million* simulated years, which included all earthquake permutations. Using this large catalog, a regional loss analysis was conducted. An optimization procedure was developed to produce 100,000-year, 50,000-year and 10,000-year catalogs by sampling the extended catalog in such a way that the smaller catalogs maintain the magnitude-frequency distributions over the fault scenarios (in the east-west direction, and over the southern, central, and northern segments) and the regional loss exceedance-probability curves.

The Charleston Zone

The USGS definition of the Charleston seismic zone is based on the occurrence of the M7.3 1886 earthquake and a large volume of paleoliquefaction data. However, there is uncertainty in the location of the causative fault for the 1886 earthquake and other paleoearthquakes. There are geophysical and geological indications that a northeasterly-directed fault zone along the Woodstock lineament might be the causative source.

To account for the uncertainty in the location of future events, USGS defines a small narrow zone that follows the Woodstock lineament and a broader zone that includes an area of known liquefaction features resulting from past earthquakes (Figure 23). This zone extends offshore to include the Helena Banks fault zone, which contains Miocene strata that appear to have been warped from reverse-faulting action. For each zone, the magnitude of the characteristic earthquake is defined by four magnitude values: M6.8, M7.1, M7.3, and M7.5, which are weighted with factors of 0.2, 0.2, 0.45, and 0.15, respectively.

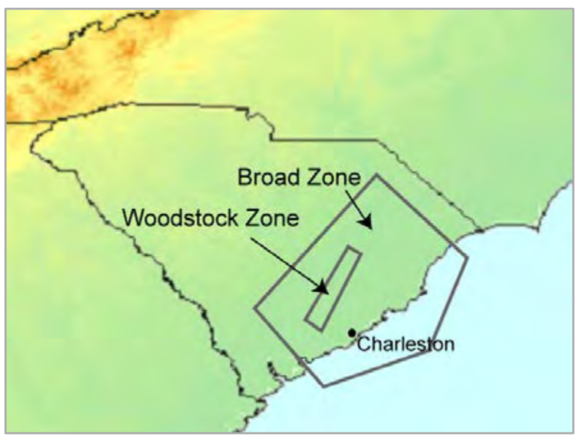

Figure 23. Charleston Fault Source Zones

Smoothed-Gridded Seismicity

The USGS model for the background seismicity in the United States is based on the integration of a number of historical and instrumentally recorded earthquake catalogs. See Section 10 for a list of references. Gridded seismicity is designed to preserve the pattern of historical seismicity but also to ensure a nonzero probability of future earthquake occurrence.

Figure 24 and Figure 25 show the distribution of past earthquakes in the western, and the central and eastern United States, respectively. After a detailed investigation of the completeness of different catalogs, the USGS formulated a detailed set of completeness times for different magnitude ranges for different areas in the western, central, and eastern United States. This information is used in conjunction with spatial correlation functions to translate the historical earthquake catalog data to magnitude-frequency distributions within longitude-latitude grid cells.

For California, the USGS assumes completeness for magnitudes of 4.0 and higher since 1933, 5.0 and higher since 1900, and 6.0 and higher since 1850. For the rest of the western United States, the catalog has completeness for magnitudes of 4.0 and higher since 1963, 5.0 and higher since 1930, and 6.0 and higher since 1850.

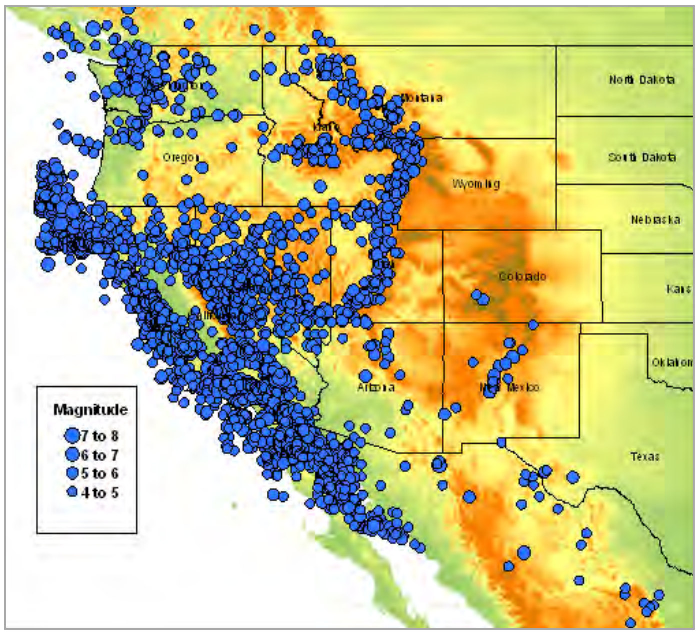

Figure 24. Spatial Distribution of Historical Earthquakes for the Western United States

For areas east of longitude 105°W (just east of the Rocky Mountains in Colorado, near Denver), the catalog is assumed to be complete at magnitudes of 3.0 and higher since 1924, 4.0 and higher since 1860, and 5.0 and higher since 1700.

The formulation of the background seismicity is based on the concept of a positive correlation between the spatial distribution of past and future earthquakes. The scale of this correlation is defined by a distance correlation function that is formulated by processing the spatial distribution of earthquakes in the historical catalog. Using this Gaussian correlation function and the completeness times for different magnitude earthquakes, the USGS calculated the likelihood of different magnitude earthquakes within grid cells.

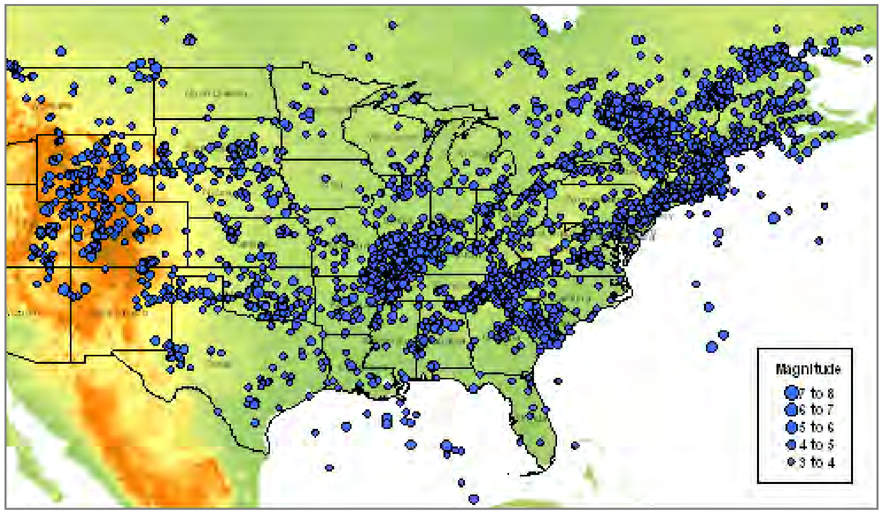

Figure 25. Spatial Distribution of Historical Earthquakes for the Central and Eastern United States

The country is divided into grid cells whose dimensions are 0.1° longitude by 0.1° latitude. The magnitude-frequency distribution of earthquakes for each cell is represented by a Gutenberg-Richter distribution which is the result of integrating different branches of a logic tree that accounts for uncertainty in the catalog earthquake magnitudes, catalog completeness, conversion of different magnitude scales, and maximum magnitudes.

The GR distribution for each cell is represented by an a-value, a b-value and an upper-bound magnitude. The a-value for each cell is determined by quantifying the historical-earthquake occurrence rate within each cell and its adjacent cells. In the central and eastern parts of the country (except for special zones, which are described below), a b-value of 0.95 is used. Upper-bound magnitudes vary: in the stable craton (an area extending from east of the Rocky Mountains into the Midwest (excluding the New Madrid zone), upper-bound magnitudes of 6.6 to 7.1 are used; for earthquakes in the extended margin (an area encompassing the South, mid-Atlantic and Northeast, and includes the New Madrid zone) the upper-bound magnitudes range from 7.1 to 7.7.

For the western United States, the USGS estimated seismicity rates by applying a single smoothed-gridded seismicity model and a b-value of 0.8. For most of the western part of the country the gridded rates are smoothed using a correlation distance of 50 km, for both shallow and deep seismicity. For some zones, an anisotropic smoothing scheme (where the parameters of the Gaussian distribution are direction dependent) is applied in order to provide some smoothing but also keep the modeled seismicity closer to the historical seismicity.

To capture this complexity, AIR seismologists formulated a procedure to integrate the different branches of the USGS logic tree for background seismicity into a single smoothed-seismicity model on grid cells that best reflect the USGS model.

Special Zones

The USGS model considers a number of special zones which are treated differently to account for variations in catalog completeness, maximum magnitude, and b-value. As shown in Figure 26, four special zones are defined in the central and eastern United States, and one is defined in eastern Canada. The average seismicity rates for the eastern Tennessee and New Madrid seismic zones are based on events with magnitudes of 3.0 or larger since 1976. The Wabash Valley zone incorporates a maximum magnitude of 7.5. The Charlevoix zone in eastern Canada incorporates a b-value of 0.76.

Figure 26. Special Seismic Zones in the Central and Eastern United States

The special zones in the western United States, shown in Figure 27, are mostly concentrated in California. These zones include those that are studied by the Working Group on California Earthquake Probabilities (WGCEP) whose findings are published in the USGS report, *Documentation for the 2008 Update of the United States National Seismic Hazard Maps*. In the figure, some of the zones are identified as shear zones. These are zones whose faults are poorly defined and for which geodetic or seismic data indicate a higher level of shear strain. Note that in the figure, the central Nevada zone is outlined in green to make it easier to see since it overlaps with the western Nevada and Mohawk-Honey Lake shear zones.

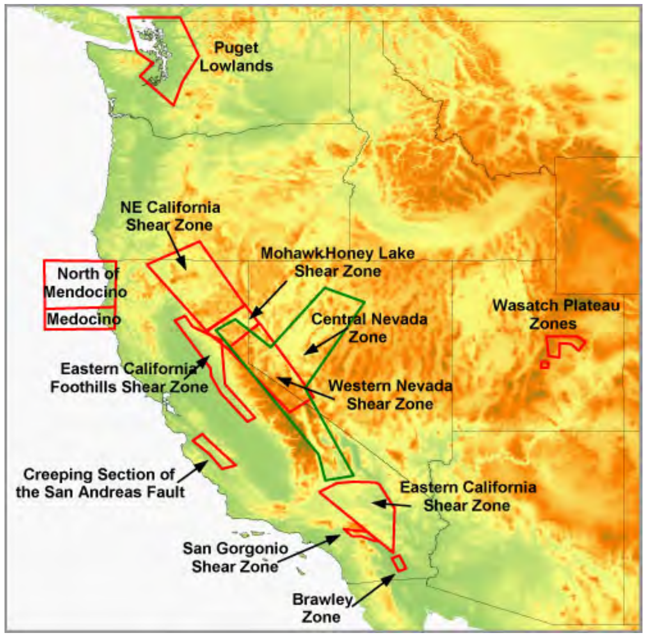

Figure 27. Special Seismic Zones in the Western United States

For the deep seismicity in the Puget Sound region, the USGS assumes completeness since 1963 for M4.0 and greater, and since 1940 for M5.0 and greater, and a b-value of 0.40. For the deep seismicity of northern California, completeness is assumed since 1963 for M4.0 and greater, since 1930 for M5.0 and greater, and since 1850 for M6.0 and greater. A b-value of 0.8 is used for the deep seismicity in this region. Anisotropic smoothing schemes are applied to the Brawley seismic zone, the creeping section of the San Andreas fault in central California, and the Mendocino fracture zone.

3.5 Time Dependence and the Model's Stochastic Catalogs

Since 2001, AIR has offered both time-dependent and time-independent catalogs as part of its U.S. earthquake model. In the current model, the time-dependent catalog is the recommended and therefore default, catalog. However, as in previous years, AIR continues to provide both a time-dependent and a time-independent view. The standard 10,000-year[5] time-dependent catalog contains 68,877 events; the time-independent catalog contains 68,570 events.

By including alternative catalogs, each of which has been developed using rigorous, scientifically defensible methods, the AIR model provides a comprehensive view of seismic risk, enabling companies to test the sensitivity of different scientific assumptions.

[5] Note that catalogs of 50,000 and 100,000 years are also available.

A time-independent catalog is based on a model that has no memory of earthquake occurrence. In other words, the annual probability of an earthquake occurring along any given fault is independent of when the last similar historical earthquake occurred along that fault. In a model such as this, the number of events occurring on a fault, or within a seismic zone, in different time intervals of the same length, follows a Poisson distribution corresponding to the mean recurrence rate.

For example, suppose a certain fault ruptures with a characteristic earthquake of magnitude 7.0 with an average annual rate of 0.01, which translates to an average of one earthquake every 100 years. A time-independent model consisting of 10,000 simulated years would have 100 such events regardless of when the last historical event occurred.

In the time-dependent models of earthquake occurrence, the probability that an earthquake will occur in the coming year increases with the length of time elapsed since the previous event. Thus in contrast to the time-independent model, the number of such events contained in a time-dependent model consisting of 10,000 simulated years would be very different if the last historical event occurred 10 years ago or 110 years ago. If the last historical event occurred 10 years ago, the probability of another event occurring within the next year would be extremely small, and there would be fewer than 100 such events in the model. If the last historical event occurred 110 years ago, the probability of another event occurring within the next year would be relatively high, and there would be more than 100 such events in the model.

The USGS update of the national seismic hazard maps does not include time-dependence. This is because the primary purpose of the maps is to support the development of building codes, which appropriately reflect a time-independent view of risk. However, it was released at the same time another report was produced by the 2007 Working Group on California Earthquake Probabilities. This report was the second version of the Uniform California Earthquake Rupture Forecast, known as UCERF2. UCERF2 describes the development of a time-dependent rupture model for faults in the state of California, and for large-magnitude earthquakes on the Cascadia subduction zone. It was the first time that a fully consistent and comprehensive time-dependent model became available, and after a thorough review and analysis by AIR seismologists, UCERF2's time-dependent view of risk was implemented as the default catalog in the AIR model.

Time-dependent fault-rupture models better represent the occurrences of characteristic earthquakes on faults, given that adequate information on the statistics of the recurrence intervals and the causative mechanisms for faulting is available. However, compared to a time-independent Poissonian model, the time-dependent model requires more information on fault-rupture history in order to construct a stochastic model for earthquake recurrence intervals on the fault. This requires knowledge of the date of the most recent previous characteristic earthquake, the shape of the probability density distribution for the recurrence intervals (e.g., lognormal or Brownian passage time), and the mean recurrence and aperiodicity values for the recurrence distribution, which measure the scale of randomness for recurrence intervals (that is, aperiodicity measures the extent to which earthquakes do *not* occur at regular intervals, like clockwork).

Due to the lack of detailed knowledge of the causative faults and faulting mechanisms in the central and eastern United States, the seismicity of this part of the country is modeled with time-independent rates. *Therefore, the AIR time-dependent catalog is in fact an integration of the time-dependent seismicity model for characteristic earthquakes on California faults and the Cascadia subduction zone, and the time-independent seismicity model for all other earthquake sources.*

To construct a time-dependent catalog, first the 30-year time-dependent probabilities for characteristic earthquakes on faults in California and the Cascadia subduction zone are calculated. These are converted to the equivalent annual occurrence rates, which are used to generate the time-dependent stochastic catalog for these source zones. These events are then merged with those from the time-independent source zones elsewhere in the United States.

UCERF2 models time dependence in two ways: fault-specific time-dependent rupture probabilities for Type-A faults using a Brownian Passage Time Renewal Model, and a zone-based model that applies “correction factors” based on empirical data to transform long-term seismicity rates into short-term rates.

The UCERF2 Empirical Model

The left-hand panel of Figure 28 shows the faults and subduction zones used for the fault-based model; the regions used for the empirical model are shown on the right.

The empirical model divides California into a number of regions and evaluates the short- and long-term seismicity of those regions. The study took place in 2006, so long-term seismicity is defined as the rate determined between 1850 and 2006. Short-term rates are, in general, estimated by averaging together (with equal weights) average seismicity rates calculated from the 1906-2006, 1942-2006, and 1984- 2006 catalogs. The years 1942 and 1984 represent points of improvement in the seismic network and catalog; and the year 1906 was used to capture the potential influence of the1906 earthquake.

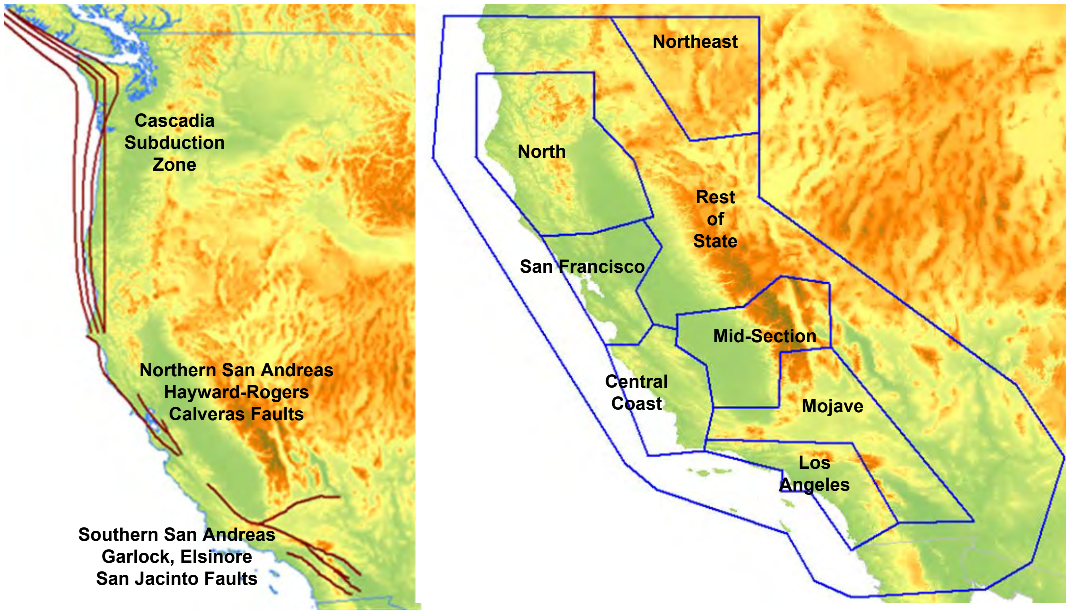

Figure 28. Faults, Subduction Zones, and Regional Zones Used for the Time-Dependent Catalog

Table 3 shows the ratio of short- to long-term seismicity according to UCERF2's empirical region-based model. Note that in every case, the short term time-dependent rate of seismicity is lower than the long term, time-independent rate.

Table 3. Ratios of Short to Long-Term Seismicity Rates

Region	Ratio of Short to Long Term Seismicity
North	0.81 ± 0.63
San Francisco	0.57 ± 0.25
Central Coast	0.69 ± 0.50
Los Angeles	0.55 ± 0.29
Mojave	-
Mid Section	0.61 ± 0.45
Northeast	-
Rest of State	0.86 ± 0.45

The UCERF2 Fault-Specific Model

Estimating time-dependent rupture probabilities for *individual faults* requires good information on such things as the historical recurrence rates of regional earthquakes, and information on the specific fault, such as mean recurrence interval and the elapsed time since the last occurrence. The interactions between nearby faults and the resulting redistribution of stresses regionally add to the complexity.

For type-A faults, the UCERF2 model used the renewal Brownian passage time model to estimate, for each fault, the 30-year occurrence probability for characteristic earthquakes. This was done using the dates of historical events on those faults. The occurrence probabilities for each fault were then used to estimate the time-dependent occurrence probabilities for all cascading scenarios on these faults.

In integrating the two models, UCERF2 assigns a 70% weight to the fault-based model (Brownian passage time) and a 30% weight to the zone-based model. The AIR Earthquake Model for the United States has implemented time-dependent probabilities in accordance with this recommendation. Accordingly, for type-B faults, the probability values were obtained by taking the weighted average of time-dependent probabilities obtained in the empirical regional model and the time-independent probability values obtained with the Poissonian model.

The Effects of Time-Dependence on Rupture Probabilities

Figure 29 shows the effects of time-dependence on rupture probabilities by comparing the time-dependent rupture scenarios to the time-independent ones. The figure on the left shows the distribution of all faults with 30-year time-dependent probabilities that are *lower* than their 30-year time-independent probabilities. The figure on the right shows the distribution of faults with 30-year time-dependent probabilities that are *higher* than their 30-year time-independent

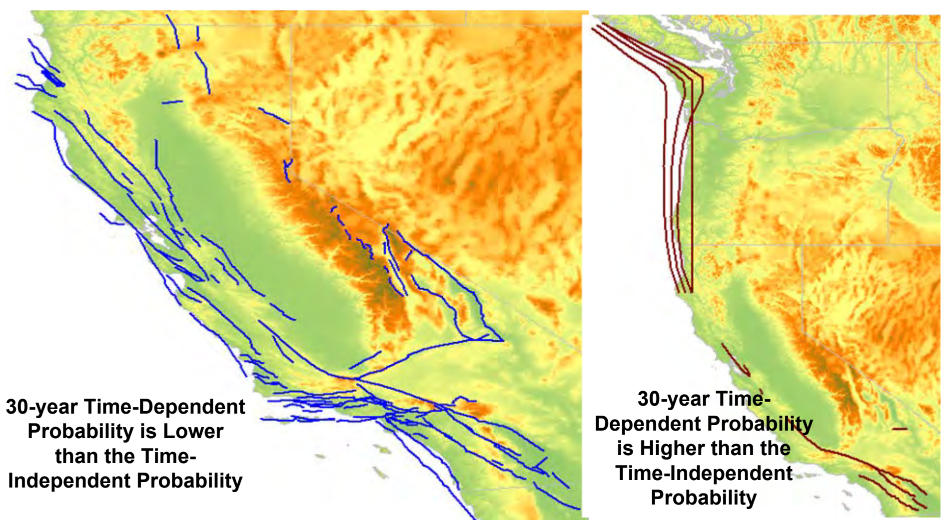

Figure 29. 30-Year Rupture Probabilities for Time-Dependent compared to Time-Independent Catalogs

The 30-year time-dependent probabilities for selected California faults, as published by UCERF2 in 2008, are shown below. They are compared with the Working Group's previous published estimates and the current time-*independent* probabilities. Note that the relatively large increases in the rupture probabilities of the San Jacinto and Elsinore faults are largely the result of the reevaluation of some paleoseismic data on certain segments of the faults and changes to cascading scenarios for those faults.

Table 4. 30-Year Time-Dependent Rupture Probabilities Compared to Time-Independent

Fault	30-Year Time-dependent Probability			30-Year Time-independent Probability
	1995	2003	2008	
S. San Andreas	53%		59%	50%
Hayward-Rogers		27%	31%	23%
San Jacinto	61%		31%	30%
N. San Andreas		23%	21%	22%
Elsinore	24%		11%	13%
Calaveras		11%	7%	7%
Garlock			6%	5%

For the Cascadia subduction zone, AIR followed the USGS method, which uses two sets of earthquakes with 500-year recurrence intervals. The magnitude 9.0 earthquakes are modeled as time-dependent. The last great earthquake occurred here in January 1700, and the time-dependent probability of a M9.0 earthquake in the next 30 years is estimated at 8.0%, compared to a time-independent rupture probability of 5.8%.

3.6 Validating Stochastic Event Generation

The methods used to validate the stochastic catalogs depend on the region of the country. Magnitude-frequency distributions can be provided for both time-independent and time-dependent catalogs for the entire country or for specific regions. For California, the historical record is sufficiently populated that comparisons between simulated and historical magnitude-frequency distributions are appropriate. For the Central and Eastern U.S. and for large magnitude events along the Cascadia subduction zone, where the historical record is sparse, comparisons between the AIR model and the USGS report are used for validation.

Validating the Frequency and Magnitude of Events in the United States

Figure 30 illustrates the magnitude-frequency distributions of simulated and historical earthquakes for the entire continental United States, showing consistency between the two. The time-dependent and time-independent catalogs are consistent with the historical catalog for events with magnitudes between 5 and 8. The difference between the time-dependent and time-independent catalogs becomes apparent at higher magnitudes.

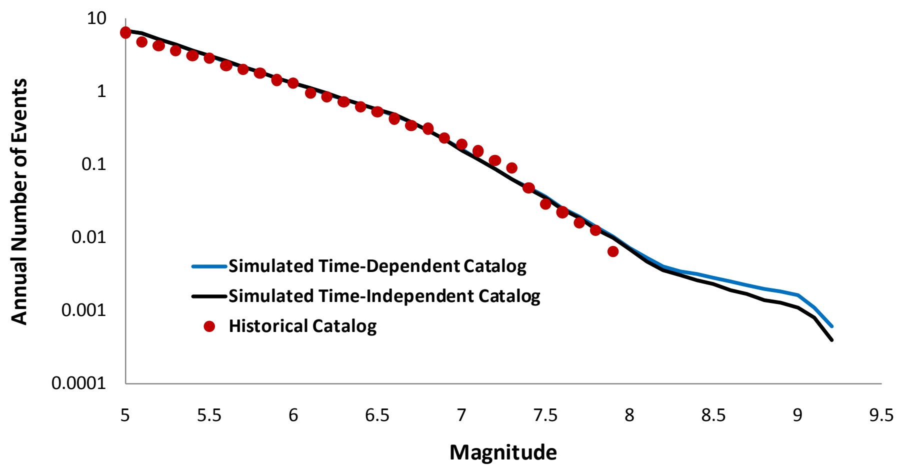

Figure 30. Comparison between the Historical and Simulated Magnitude-Frequency Distributions for the United States

Validating the Frequency and Magnitude of Events in California

Figure 31 displays the magnitude-frequency distributions of time-independent simulated and historical earthquakes in California, showing consistency between the two. Again, the time-dependent catalog's higher rate for large magnitude events is reflected in the figure.

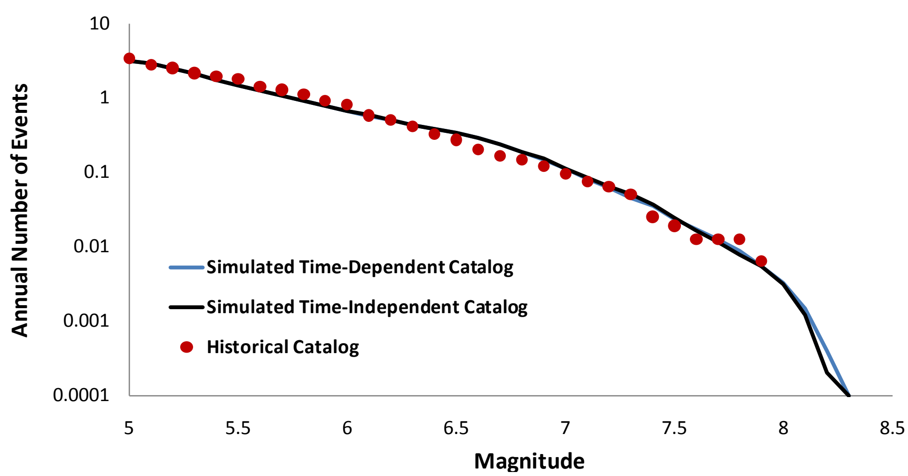

Figure 31. Comparison between the Historical and Time-Independent Simulated Magnitude-Frequency Distribution for California

Validating the Frequency and Magnitude of Events in the Cascadia Subduction Zone

Figure 32 shows a comparison between the cumulative magnitude-frequency distribution for the characteristic interface earthquakes in the Cascadia subduction zone as modeled by the USGS and by AIR. Immediately apparent is the higher rate for the time-dependent catalog compared to the time-independent catalog. For validation purposes, a comparison between the USGS distribution (which is time-independent) and the AIR time-independent distribution is more appropriate.

According to USGS, the recurrence interval for rupturing any location along the Cascadia subduction zone is 500 years. If the interface were modeled by a single M9.0 earthquake, then the plot would have shown a maximum cumulative rate of 0.002 or 1/500 per year. However, the subduction-zone seismicity is modeled by a logic tree and earthquakes with magnitudes ranging from 8.0 to 9.2. Earthquakes smaller than M8.8 do not rupture the entire subduction zone; therefore more of them are required to create a 500-year rupture recurrence at every location along the subduction zone. This fact and the criteria used to balance the seismic moment for the subduction zone are responsible for the difference between the USGS and AIR time-independent magnitude-frequency distributions at the higher magnitudes.

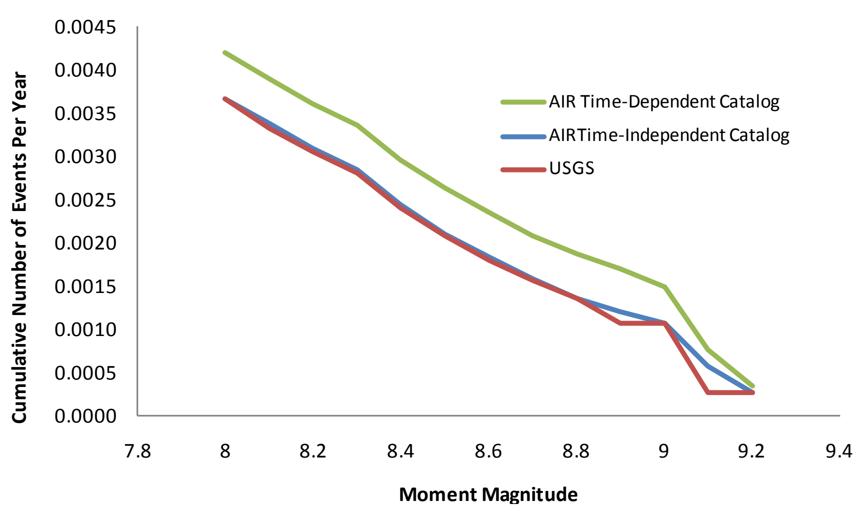

Figure 32. Magnitude-Frequency Distributions for the Time-Independent Simulated Catalog vs. the USGS Report for the Cascadia Subduction Zone

Validating the Frequency and Magnitude of Events in the New Madrid Seismic Zone

The historical catalog contains only one very large historical event for each of the two seismic zones of interest in the central and eastern United States—New Madrid (albeit in the new USGS maps the single New Madrid "event" is now treated as three separate earthquakes) and Charleston. Thus validation in terms of comparing the simulated catalog with the sparse historical catalog is not meaningful. Instead, a more appropriate exercise is to validate AIR earthquake rates against those proposed in new USGS seismic hazard maps.

As shown in Figure 21 in Section 3.4, the USGS proposes five different possible fault traces, each of which has a weighting factor that indicates, in catalog terms, the percentage of earthquakes occurring on that rupture. The rupture trace in the center has the highest weighting factor of 0.7, or 70%. The two traces on either side of the middle trace have weighting factors of 0.1 each, or 10%. The two outer traces have weighting factors of 0.05, or 5%.

Figure 33 shows the percent distribution of simulated earthquakes over the five rupture areas based on the counts from the AIR stochastic catalog. The figure shows complete agreement between the AIR model and the USGS recommended weights for different rupture traces.

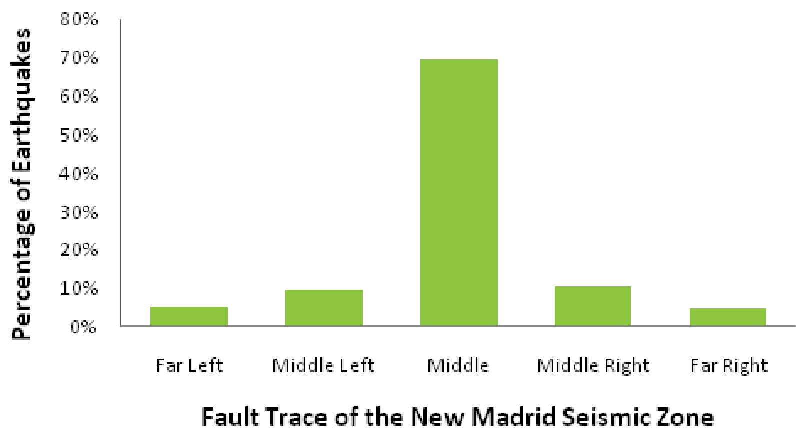

Figure 33. Percentage of Earthquakes on each Branch of the New Madrid Seismic Zone.

The USGS employs a very complex magnitude recurrence model for earthquakes in the NMSZ that consists of a set of correlated and uncorrelated events on the three segments, with different magnitude and recurrence-interval distributions for the northern versus the central and southern segments. The USGS model is reflected in the logic tree shown in Figure 22 in Section 3.4.

The portion of that tree used for determining the event rate for unclustered events is shown in Figure 34. The logic tree shows a probability of 0.9 for a recurrence period of 500 years and a probability of 0.1 for a recurrence of 1,000 years. Using these factors for each recurrence rate, we can calculate a rate of 0.00095 for these unclustered events based on the USGS logic tree.

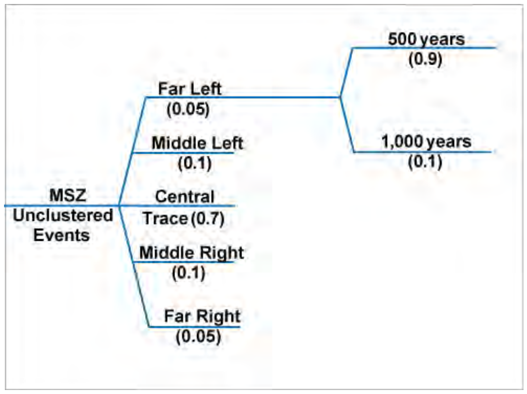

Figure 34. Portion of the New Madrid Logic Tree showing Unclustered Event Rates

Figure 35 shows the magnitude-frequency distribution of AIR simulated events for the unclustered earthquake scenario. In the figure, the cumulative rates indicate the event rates for all events of a given magnitude and higher. For example, the cumulative rate for the M7.1 bar shows the rate for all earthquakes of M 7.1 and higher.

The cumulative rates in this figure reflect the weighted integration of the 500-year and 1,000-year recurrence scenarios for the New Madrid seismic zone as shown in the USGS logic tree, with the 50% weighting factor applied to the single-earthquake scenario. The total rate shown is 0.00092, which is very close to the USGS rate obtained from the logic tree.

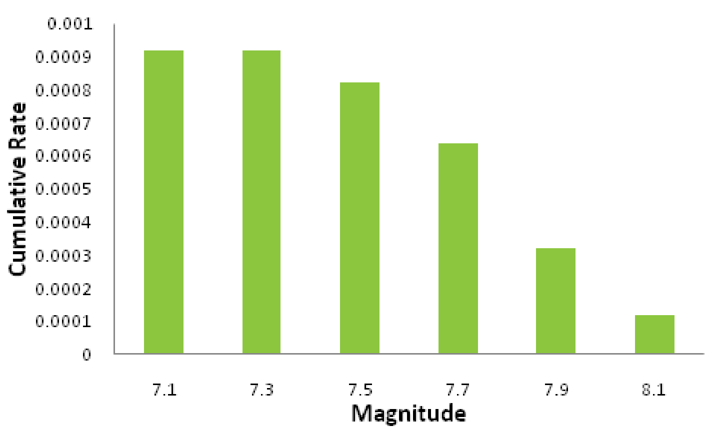

Figure 35. Magnitude-Frequency Distribution of Simulated Events for a Single Earthquake Scenario

For clustered events, the USGS logic tree shows a 500-year recurrence for the southern and central segments, and a 750-year recurrence for a rupture of the northern segment. A portion of the tree used for clustered events in shown in Figure 36.

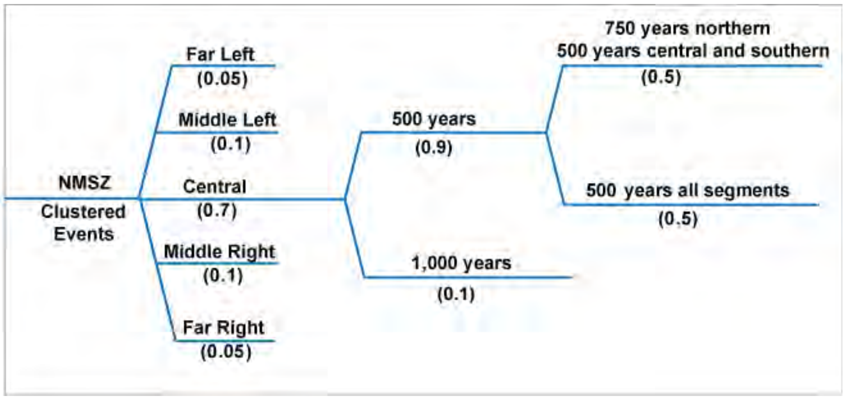

Figure 36. Portion of the New Madrid Logic Tree showing Clustered Event Rates

Figure 37 shows the magnitude-frequency distribution for the New Madrid correlated-triplet scenario event set. The cumulative rates on this figure indicate the weighted integration of the recurrence scenarios shown in the logic tree for clustered events, with the 50% weighting factor applied to clustered events. The total rate shown is 0.00098, which again is very close to the calculated rate of 0.00099 from the USGS logic tree.

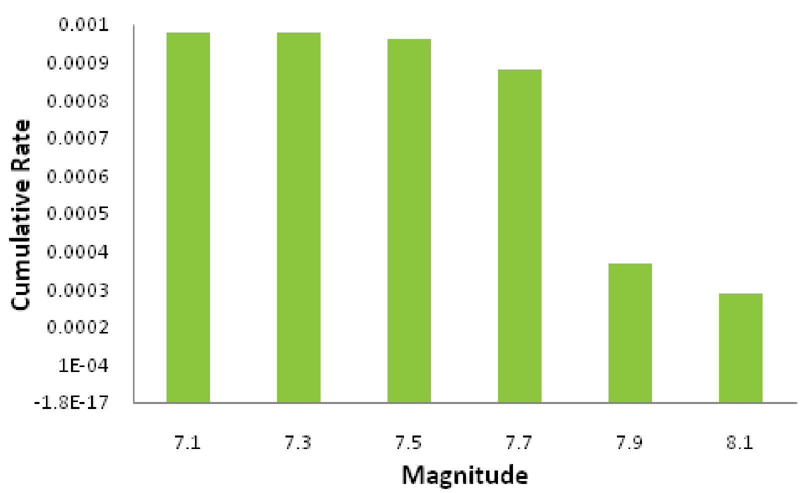

Figure 37. Magnitude-Frequency Distribution of Simulated Events for Correlated Scenarios

The overall magnitude distribution (Figure 38) reflects the magnitude distribution for the south and central segments, and the lower magnitude range for the northern segment.

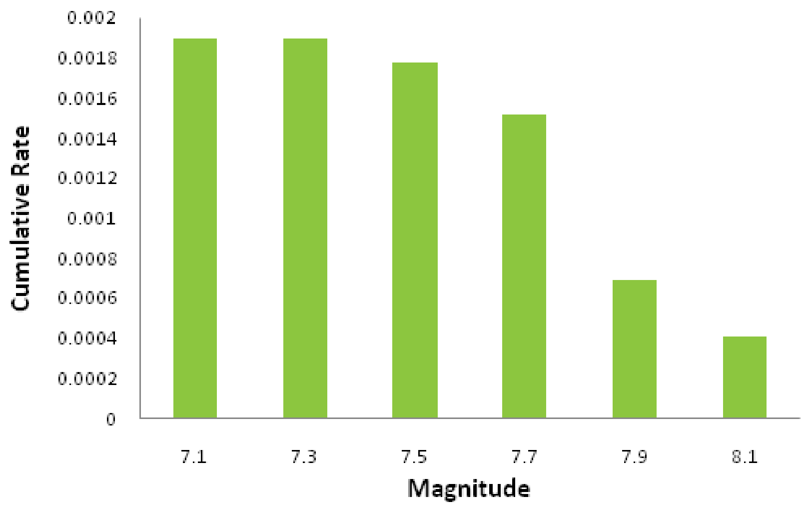

Figure 38. Magnitude-Frequency Distribution of Simulated Events for Both Single Earthquake and Correlated Scenarios

Validating the Magnitude and Frequency of Events in the Charleston Zone

For the Charleston seismic zone, the USGS created a characteristic model for each areal zone. Their magnitudes are shown in with weighting factors. A recurrence time of 550 years was used. The weighting factors were obtained by the USGS using their areal source zones to account for uncertainty in the location of future earthquakes.

Table 5. Characteristic Magnitudes in USGS Model for the Charleston Zone

Magnitude	Weight
6.8	0.2
7.1	0.2
7.3	0.45

Figure 39 shows the magnitude distribution of AIR simulated events by showing the frequency of events for each magnitude range. The weighting factors used by USGS compare well to the AIR model, showing a highest probability for earthquakes with magnitudes of approximately 7.3.

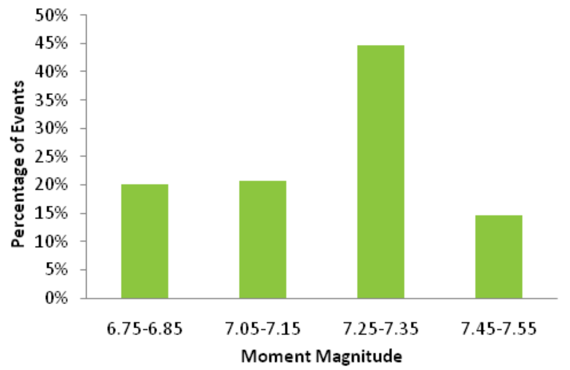

Figure 39. Magnitude Distribution of Simulated Events for the Charleston Seismic Zone

Validating Smoothed Gridded Seismicity

Figure 40 shows a comparison between the spatial distributions of the USGS and AIR's smoothed-seismicity rates using 0.1 degree wide grid cells.

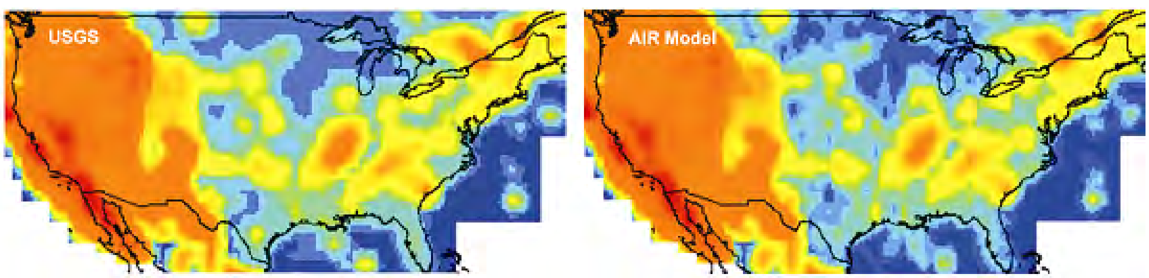

Figure 40. Smoothed-Gridded Background Seismicity from the USGS (left) and AIR (right)

The AIR smoothed-seismicity rates are used to produce a one million-year stochastic catalog that is then used to create optimized 10,000-year , 50,000-year and 100,000-year stochastic catalogs in such a way that they satisfy regional magnitude-frequency and loss-distribution requirements—thus the excellent agreement between the USGS and AIR maps shown in Figure 40.

4 Local Intensity Calculation

The measures of intensity used in the AIR Earthquake Model for the United States comprise a variety of ground motion parameters, including spectral acceleration (Sa) at different periods, and Peak Ground Acceleration. Additional detail on how each is implemented in the model can be found in Section 5. This section provides information on the derivation of ground motion parameters by region.

4.1 Ground-Shaking Intensity

In order to analyze damage and loss for each simulated earthquake, the ground motion intensity at each affected surface location must be calculated. This ground motion can range from barely perceptible trembling to violent shaking, depending not only on the magnitude of the event, but also on the distance from the rupture to the affected site, the geological characteristics of the region, and local site conditions.

Ground-shaking intensity is commonly measured in term of peak ground acceleration (PGA) and spectral acceleration (S_a). The peak ground acceleration is the maximum value of the ground acceleration and is typically referred to as motion in the horizontal direction. Spectral acceleration is the maximum response of a simple building, with a single natural frequency of vibration, to earthquake ground motions. S_a approximates what a building experiences as modeled by a particle mass on a massless vertical rod having the same natural period of vibration as the building.

As discussed in more detail in Section 5, different buildings respond differently to the ground motion that occurs during a particular earthquake. A building will be most sensitive to ground motion components that are close to its natural frequency of vibration. Thus, while PGA is the maximum acceleration experienced at a free ground surface, spectral acceleration is more relevant for estimating building damage.

4.2 Attenuation Relationships

Empirical attenuation relationships are practical tools used to estimate ground-shaking intensity in terms of the magnitude, location, and rupture mechanism of an earthquake. These equations describe the rate at which certain ground motion parameters decrease with distance as the waves propagate outward from the rupture site. This decrease is caused by the absorption and scattering of energy as the waves travel through the earth.

The general form of the attenuation functions used in the AIR Earthquake Model for the United States is as follows:

$S_a = f(M, D, d, F, B, C, T)$

where

S_a = spectral acceleration or PGA

M = earthquake magnitude

D = distance from rupture plane

d = focal depth

B = basin effect

C = site condition

F = faulting mechanism

T = Natural period of vibration (inverse of frequency)

The AIR model implements attenuation relations for three seismic regions of the continental United States as described below and in accordance with the 2008 USGS seismic hazard maps. For loss analysis, the AIR model uses the weighted average ground motion from different sets of attenuation equations, as recommended by the USGS, with weighting factors defined by the USGS logic trees. This captures the epistemic uncertainty in the calculated ground motion as recommended by the USGS. Peak ground acceleration and different spectral acceleration values are used to formulate the earthquake building response.

For all three regions, the attenuation relations modify the reference shear wave velocity to 760 m/s, which is in accordance with the 2008 USGS update.

Western United States

One of the most important components of the 2008 USGS National Seismic Hazard Maps is the incorporation of new attenuation equations for crustal faults in the Western U.S.

Because of scarce data, the prediction of ground motion at sites very close to faults from large earthquakes was previously heavily guided by "expert opinion, " which concluded that the ground motion under such conditions must be very high. Since the mid 1990s, however, the number of strong motion stations deployed around the globe has multiplied and they have recorded some of the large magnitude earthquakes that have occurred since. To exploit this infusion of new data—more than three times the amount than had previously been available—a multidisciplinary research effort was initiated in 2003. The effort, which ended in 2007, was called the "Next Generation of Ground Motion Attenuation Models" (NGA) project. It focused on predicting ground motion from shallow crustal earthquakes in the WUS in particular and similar active tectonic regions more generally.

Five groups of scientists were tasked with developing the NGA attenuation equations, or ground motion prediction equations. By the time the USGS maps were published, three of the five developers had published their research. Those three—Boore and Atkinson (2008), Campbell and Bozorgnia (2008), and Chiou and Youngs (2008)—were incorporated in the new USGS maps. Shortly thereafter, a fourth NGA equation was published, that of Abrahamson and Silva (2008). AIR has implemented all four equations, weighted equally as recommended by the USGS, in the AIR Earthquake Model for the United States.[6]

The result of the NGA project is a set of attenuation equations that are more reliable and scientifically defensible than any previously produced. Because they use a higher quantity and quality of ground motion data, the NGA equations provide a more realistic (i.e., data-driven) estimate of the ground motion in terms of the faulting mechanisms, focal depth, site location relative to the hanging wall, basin depth, and site conditions.[7]

The NGA equations provide a more realistic estimate of ground motion for large-magnitude earthquakes at close distances thanks, in part, to the 1999 Chi-chi (Ji-ji) M7.6 earthquake, which provided a wealth of data for the near field. The use of ground motion data from international events is appropriate since near-field earthquake ground motion is not very sensitive to regional geological differences and is instead mostly controlled by the source rupture details. Seismological studies on these international earthquakes indicate that they have source mechanisms and rupture details that are very similar to those of crustal earthquakes in the western United States.

Figure 41 shows the ground-shaking attenuation for simulated earthquakes on crustal faults in the western United States with magnitudes of 6.0, 7.0, and 8.0. One of the important features of the new NGA equations is the ground-motion saturation of large-magnitude earthquakes. At large magnitudes, the calculated ground motion at distances below 10 km is relatively insensitive to magnitude compared to previous attenuation equations for crustal earthquakes. That is, earthquakes above a certain magnitude, say M7, appear to produce ground

[6] The fifth NGA equation, developed by I.M. Idriss, has been more controversial and is deemed less credible by some. It was not implemented in the USGS hazard maps.
[7] It is interesting and important to note, however, that despite the use of the same dataset and the strong collaboration among the groups, the equations still show considerable differences in ground motion prediction. The database of recordings is still not sufficiently populated to remove uncertainty altogether.

motions at sites very close to the causative fault that are very similar regardless of the magnitude of the event.

This can be seen in Figure 41, in the spectral values for M7.0 and M8.0 at distances below 10 km. The main reason for this observed saturation is that, for crustal faults beyond certain magnitudes, the fault rupture width does not increase with increasing magnitude. Instead, the magnitude increases because the rupture length increases. For a long rupture area, the contribution of seismic energy from a distant part of the fault (relative to the observation point), is small because waves have to travel a long distance and will be attenuated.

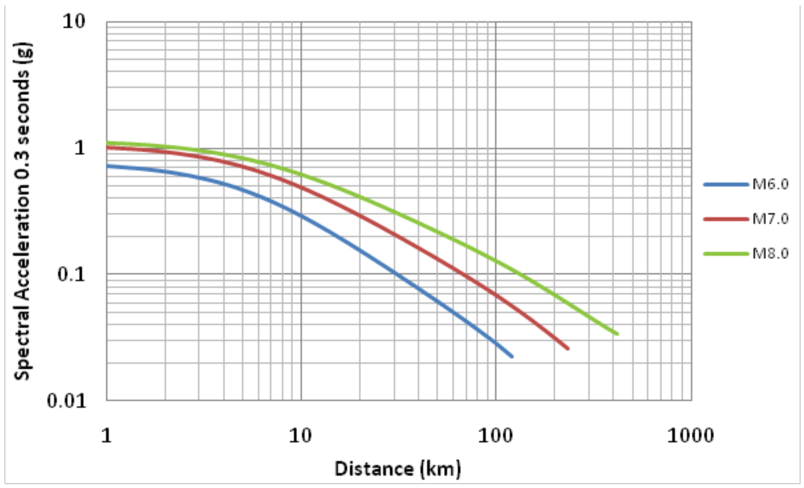

Figure 41. Ground Motion Attenuation for Earthquakes on Crustal Faults in the Western United States for 0.3 s S_a (g)

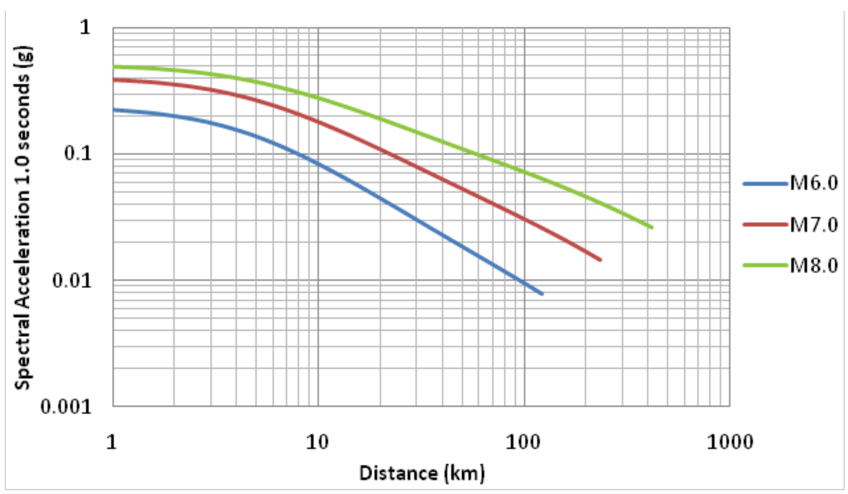

Figure 42. Ground Motion Attenuation for Earthquakes on Crustal Faults in the Western United States for 1.0 s S_a (g)

By the time the 2008 USGS seismic hazard maps were published, three of the new attenuation equations were also published and were incorporated in the new USGS maps. Shortly thereafter, an additional NGA equation was published by Abrahamson and Silva (2008). In the AIR Earthquake Model for the United States, AIR has implemented all four of these equations, weighted equally as recommended by the USGS (Table 6). The result is a set of attenuation equations that are more reliable and scientifically defensible than any previously produced.

Table 6. Attenuation Equations and Weighting Factors, Western United States

Attenuation Equation	Weighting Factor
Abrahamson and Silva (2008)	0.25
Boore and Atkinson (2008)	0.25
Campbell and Bozorgnia (2008)	0.25
Chiou and Youngs (2008)	0.25

Cascadia Subduction Zone

The NGA equations were developed specifically for crustal faults in active tectonic environments such as California. (They are suitable for similar tectonic regions both inside and outside of the U.S.) However, new attenuation equations were also adopted by the USGS in their 2008 seismic hazard maps for the Pacific Northwest where seismicity is dominated by the Cascadia Subduction Zone.

For subduction zone and deep in-slab events in the Pacific Northwest, an equation published by Zhao et al. (2006) replaced that of Sadigh et al. (1997). The new equation is derived from strong-motion recordings from interface earthquakes in Japan and was weighted equally with Youngs et al. (1997), and Atkinson and Boore (2003), which were also used in the previous maps. The equations and their weighting factors for both subduction-zone and deep events are listed in Table 7.

Figure 43 shows the subduction attenuation for the Pacific Northwest (Washington, Oregon, and Idaho) for simulated earthquakes with a magnitude of 9.0. For earthquakes of smaller magnitudes, see Figure 44, which shows the ground motion attenuation for deep earthquakes in the Pacific Northwest.

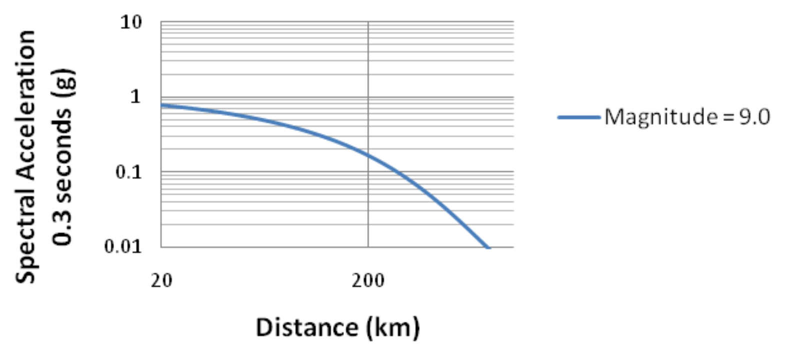

Figure 43. Ground Motion Attenuation for Subduction Zones in the Pacific Northwest

Figure 44 shows attenuation for the Cascadia zone, for deep earthquakes of magnitudes 6.5 and 7.5.

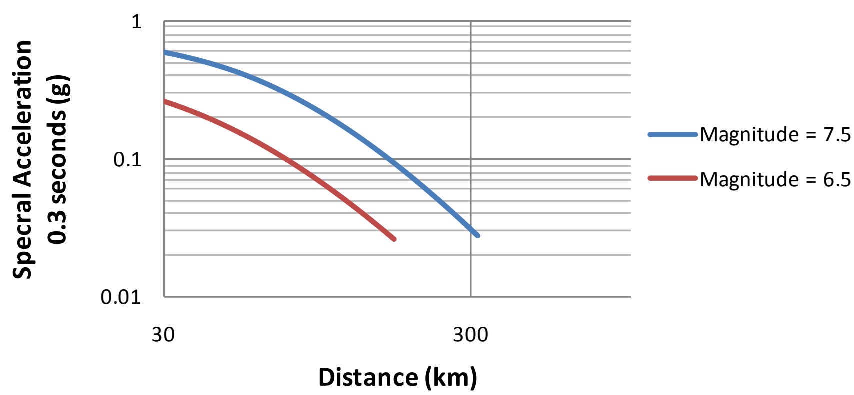

Figure 44. Ground Motion Attenuation for Deep Earthquakes in the Pacific Northwest

Table 7. Attenuation Equations and Weighting Factors, Pacific Northwest

	Attenuation Equation	Weighting Factor
Subduction Events	Youngs et al. (1997)	0.25
	Atkinson and Boore (2003)	0.25
	Zhao et al. (2006)	0.5
Deep Events	Youngs et al. (1997)	0.5
	Atkinson and Boore (2003)	0.5

Central and Eastern United States

For the central and eastern United States, three attenuation relations from the 2002 USGS hazard maps were retained in the 2008 maps, namely Frankel et al. (1996), Somerville et al. (2001), and Campbell (2003), but four were added: Toro et al. (1997), Atkinson and Boore (2006), Tavakoli and Pezeshk (2005), and Silva et al. (2002). Each is weighted according to the ground motion/tectonic characteristics it was designed to address, which may include magnitude saturation, constant or variable stress drop, or the phenomenon known as the Moho Bounce (whereby seismic waves that initially head downward from the hypocenter bounce off the dense rock of the Earth's mantle and head back to the surface, resonating with direct waves and exacerbating the damage potential). The number of attenuation equation used by the USGS in this region reflects the high uncertainty in the formulation of the ground motion here and the need to consider many credible models to account for the related epistemic uncertainty.

The attenuation equations for the central and eastern U.S. all are based on stochastic numerical simulations that integrate observations with the latest scientific knowledge of the earthquake rupture process. In general, earthquakes in the central and eastern U.S. tend to have a higher stress drop when compared with earthquakes in the western US. For any given magnitude, this leads to a stronger radiation of ground motion, especially at high frequencies. Also, in this part of the country, the older formation of crustal rocks causes the ground motion to decay more slowly with distance than in the western U.S. The ground motion variability encompassed by different attenuation equations in the CEUS reflects the differences in the experts' opinions on how to formulate and capture these complex phenomena.

The AIR ground motion model for the central and eastern U.S. follows the USGS recommendations and weighting factors for the seven attenuation equations, which are listed in Table 8. Note that the Table 8 shows eight publications. The contribution by Atkinson and Boore (2006) is an average of their modeled ground mostion, assuming two different values of the stress drop. Figure 45 shows the ground motion attenuation in the central and eastern United States, for simulated earthquakes of magnitude 6.0, 7.0, and 8.0.

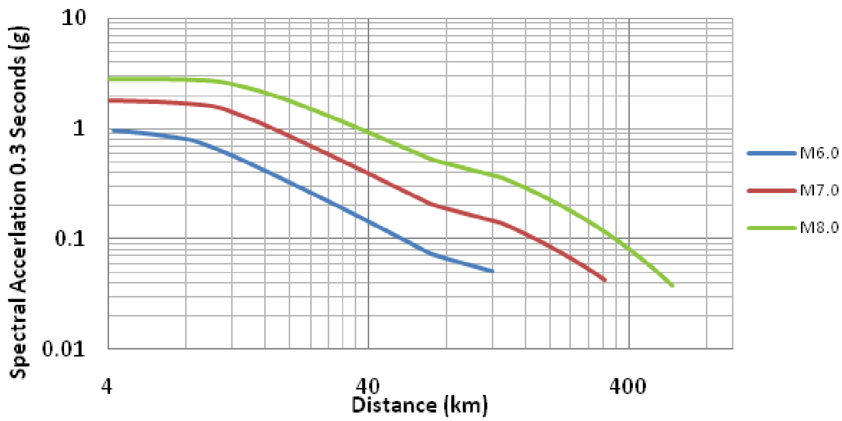

Figure 45. Ground Motion Attenuation for the Central and Eastern United States

Table 8. Attenuation Equations and Weighting Factors, Central and Eastern United States

Attenuation Equation	Weighting Factor
Frankel et al. (1996)	0.1
Somerville et al (2001)	0.2
Campbell (2002)	0.1
Toro et al. (2005)	0.2
Atkinson and Boore (2006), 140-bar stress drop	0.1
Atkinson and Boore (2006), 200-bar stress drop	0.1
Tavakoli et al. (2005)	0.1
Silva et al. (2002, 2005)	0.1

4.3 Site Amplification Due to Surface Geology

Local site conditions can dramatically alter the intensity and to some degree the frequency content of the ground motion at a site. Shaking intensity in a given area reflects the local surface geology, as ground-motion intensities vary in part due to these geological properties. The AIR Earthquake Model for the United States uses surficial geological maps and high-resolution topographical data to develop soil classification maps at various scales.

There are three layers of soil maps, each with a different resolution and areal coverage. The first layer is the base soil map that covers the entire continental United States. This map was developed from the unified 1:500,000 digital geological maps in the 48 conterminous states and topographic data, and has a model resolution of about 0.5 km. The second layer covers 17 states, including three on the west coast, nine within the New Madrid seismic zone, and five in the northeast. These state soil maps were developed based on larger scale (1:100,000 to 1:250,000) surficial or quaternary state geological maps. The model resolution for these maps varies from 100 meters to about 500 meters.

The third layer covers local areas with concentrated exposure and significant seismic risk. The model resolution in these maps is 50 to 100 meters. Most of these maps, such as those covering New York City, northeastern New Jersey, southern Illinois, San Francisco, and Los Angeles, were developed by researchers and geologists in state geological surveys.

Table 9 shows the spatial coverage, data type, resolution and sources of the maps implemented in the AIR model.

Table 9. Soil Maps Implemented in the AIR Earthquake Model for the U.S.

Region	Source Data	Model Resolution (meters)	Reference
New York City	Soil Maps	50	Jacob, K., N. et al 2000
Northeastern New Jersey (8 counties)	Surficial Geological Maps, Borehole Data, Shear Wave Velocity Data	100	New Jersey Geological Survey, 1999 – 2008
Southern Illinois (39 counties)	Soil Maps	100	Bauer, R. A. et al. 2007
Salt Lake City, Utah	Geological Maps	100	Bryant, B. 1990
San Francisco, California	Soil Maps	100	Wentworth, C. M. 1997
Los Angeles, California	Soil Maps	100	Yerkes, R. F. et al. 1997; Morton, D. M. 1999
Portland, Oregon	Soil Maps	100	Beeson, M. H. et al. 1991
Seattle, Washington	Soil Maps	100	Washington State Department of Natural Resources 1993
Charleston, South Carolina	Soil Maps	100	Geological Survey of South Carolina 2003
California	Geologic Maps	200	California Geological Survey 1950-1990
New Jersey	Surficial Geological Maps	100	New Jersey Geological Survey 2006
New York	Surficial Geological Maps	300	New York State Museum Technology Center 1999
Connecticut	Quaternary Geological	300	Connecticut Geological and Natural History Survey 2000; Map 1998
Vermont	Surficial geological Maps	100	Vermont Geological Survey 2008
Massachusetts	Digital Surface Geology Maps	250	Massachusetts Geographic Information System 1999
Illinois	Stack-Unit Mapping of Geological Materials to a Depth of 15 Meters	400	Illinois State Geological Survey 1995, Revision 2004
Washington	Geological Maps	100	Washington Division of Geology and Earth Resources 2005
Oregon	Geological Maps	100	Oregon Department of Geology and Mineral Industries 2004-2009
New Madrid zone (8 states)	Soil maps, Geology, Topography	500	Central United States Earthquake Consortium (CUSEC) 2007
Continental United States (includes Washington D.C.)	Geologic maps, Topography	500	1:500,000 Geologic Maps in 47 states, USGS1997-2007

These maps have not only employed detailed surficial geological data, but also a large amount of shear-wave velocity data in surficial geological materials, estimated based on geotechnical and geophysical methods.

Figure 46 illustrates the difference in the level of detail between the 500-meter base map and a higher resolution map for western Washington.

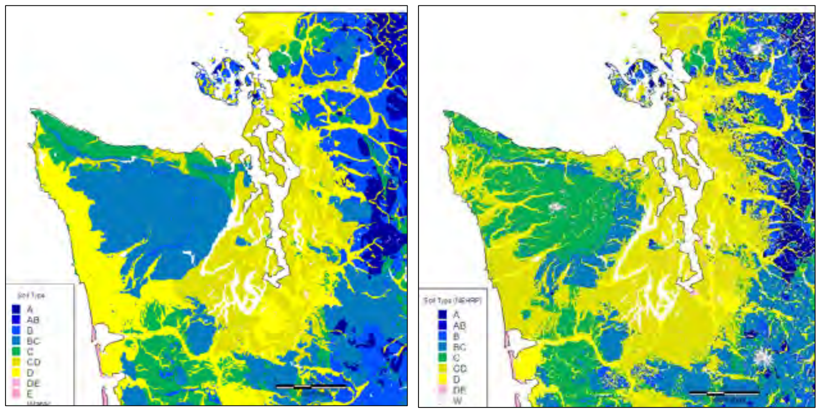

Figure 46. Nationwide 500-meter Base Soil Map (left) and Higher Resolution (100-meter) State Soil Map (right) for Western Washington State

The NEHRP soil types shown in Figure 46 are defined in Table 10, which also lists the average shear-wave velocities for each soil class. Note that intermediate soil types are expressed as a combination of two classes. The average shear-wave velocity for a given soil type is determined from the shear-wave velocities observed in each region that is identified with the soil type.

Table 10. Soil Classifications and Average Shear-Wave Velocities

Soil Class	Description	Average Shear Wave Velocity (m/s)
A	Very hard rock (crystalline rock with few fractures)	1620
AB	Hard rock	1150
B	Firm to hard rock	1050
BC	Firm rock	760
C	Soft to firm rock (gravelly soil and soft rock)	540
CD	Soft rock (gravelly and stiff soil)	370
D	Stiff clay and sandy soil	330
DE	Soft soil to firm soil (silty clay and sand)	280
E	Soft soil (includes bay mud)	160
Special soft soil for New Madrid Zone		220

These soil classifications accommodate variations in ground motion amplification, since the amplification factors are calculated directly from the mean shear-wave velocities. Thus, the soil classifications give a more accurate prediction of ground-motion amplification wherever detailed soil data and shear-wave velocity measurements are available.

Ground motion at each location depends on the magnitude and fault mechanism of the earthquake, the local surface geology, and the propagation path of the seismic waves. Maps detailing the average shear-wave velocity in the upper 30 meters of soil (the 30 meters immediately below the surface of the earth) are used to estimate site amplification. These are known as Vs30 maps.

For some areas of the United States, the model includes more than one geological map. If the low-resolution Vs30 map provides detailed information regarding low-velocity seismic waves, then the data from this map and the higher resolution map(s) are used with equal weight. However, if the low-resolution Vs30 map does not demonstrate adequately detailed information on, then only the high-resolution maps are used.

Topographic Slope Effects

AIR has implemented a methodology recently developed by the USGS for characterizing site conditions; the methodology is used to augment geologic data with topographic data. Recent studies show a positive correlation between the topographic slope and shear wave velocity of surficial material (soils) as shown in Figure 47. This results from the fact that areas characterized by a gentle topographic slope are more likely to accumulate soft soil sediments than areas with steeper slopes.

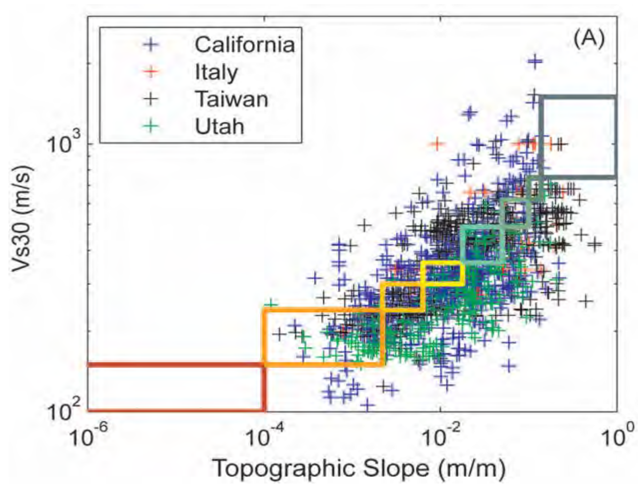

Figure 47. Several Recent Studies Reveal Positive Correlation between Topographic Slope and Shallow Shear-Wave Velocity

AIR has leveraged this relationship to produce far more detailed shear-wave velocity maps used in the formulation of regional site conditions. An example is shown in Figure 48, which illustrates shear-wave velocity maps in the San Francisco area; one based on geological data alone (left-hand panel) and one that takes topographic slope into consideration (right-hand panel).

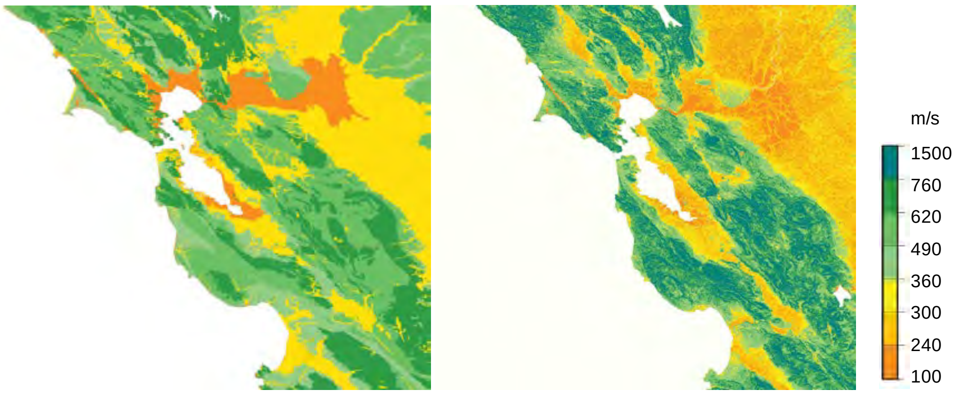

Figure 48. Shear-Wave Velocity Map Based on Geological Data only (left) and Augmented Based on Topographic Slope (Right)

Alluvial Basin Effects

The ground motion on deep alluvial basins can be further amplified above and beyond what would be expected using the near-surface soil stiffness parameter only. If the basin depth is provided for an area, the NGA equations can account for its effect on ground motion.

While the USGS adopted a neutral approach by using a uniform basin depth that had the effect of cancelling out any significant amplifying or deamplifying effect, AIR went further, collecting and implementing depth information at high (0.2 km) resolution for major basins in California, Washington, and Nevada (Figure 49). The AIR model therefore takes full advantage of the capabilities of the NGA equations.

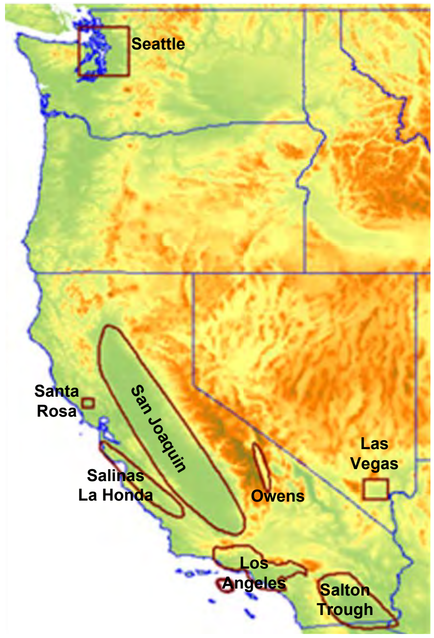

Figure 49. Alluvial Basins in California, Washington and Nevada

While the impact of basin effects is relatively small, there are implications for tall buildings located on deep basins. All else being equal, the deeper the basin, the greater will be the amplification of long-period ground motion, which resonates with the natural periods of tall, flexible buildings, making them more vulnerable.

4.4 Liquefaction

When an earthquake strikes an area that is saturated with groundwater, the shaking can cause the soil to lose its stiffness due to increased water pressure, and behave like a heavy liquid. When this happens, the soil loses its capability to support structures. Buildings can suddenly tilt or even topple over as the ground beneath them becomes liquefied. Pipelines and ducts can surface, and as the liquefied soil shifts, it can break buried utility lines.

Liquefaction is more likely in areas with granular soils that have poor drainage and are saturated with water. An example would be silty sands, which are found along riverbeds, beaches, dunes, and other areas where sands have accumulated. If the saturated soil lies underneath a dry crust, the ground motion can crack the top dry soil allowing the liquefied sand to erupt through the cracks, creating sand boils. Sand boils can spread through utility openings into building, and damage the building or its electrical system.

During the Loma Prieta earthquake in 1989, a significant amount of the destruction in the Marina District of San Francisco was due to liquefaction. When the Nisqually earthquake struck the Seattle area in 2001, liquefaction caused sand boils and collapsed pits on Harbor Island.

The AIR Earthquake Model for the United States includes a liquefaction component that relies on the availability of accurate data concerning groundwater depth. The AIR model assesses the risk of liquefaction for the seven regions that have sufficient groundwater-depth data along with a history of liquefaction occurrences during earthquakes. (This data was obtained from the USGS.) These areas include the greater San Francisco and Los Angeles areas; Portland, Oregon; Seattle, Washington; Salt Lake City, Utah; and the New Madrid and Charleston seismic zones. It is important to note that liquefaction is a secondary hazard. Although liquefaction damage alone may be severe on a particular structure, its contribution to the total damage caused by an earthquake is relatively small.

AIR has mapped the groundwater depths for those areas that are included in the liquefaction model. Figure 50 show the areas covered by the AIR model's groundwater depth data in the western (left-hand panel) and eastern (right-hand panel) sections of the country.

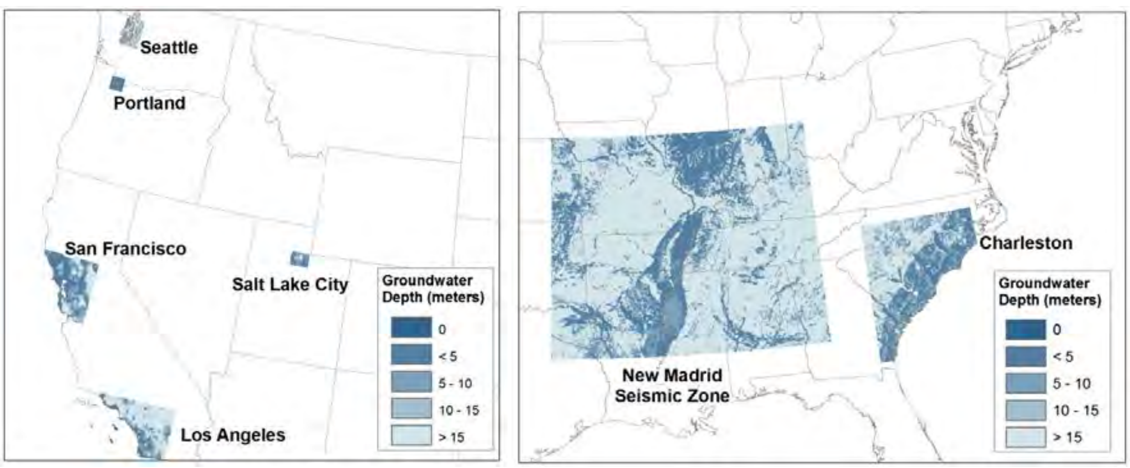

Figure 50. Groundwater Depths for Liquefaction-Modeled Areas in the Western (left) and Eastern (right) United States

The liquefaction estimation method, which compares liquefaction resistance to liquefaction demand, follows collective research summarized by Idriss and Boulanger (2008) and Youd et al. (2001). Liquefaction resistance is dominated by soil strength characterized by shear-wave velocity and groundwater depth, while liquefaction demand is a function of ground motion intensity. The building damage caused by liquefaction is calculated based on liquefaction-induced ground settlement recommended by Ishihara and Yoshimine (1992).

Note that in the AIR Earthquake Model for the United States shake damage and damage caused by liquefaction are combined and are not separable in the software.

4.5 Ground Motion Intensity and Spatial Correlation

The assessment of ground motion intensity has traditionally been based on an approach that used event magnitude, the source-to-site distance, and the local soil conditions. These calculations also accounted for variability in the ground motion, based on observed deviations during historical earthquakes. The variable ground motion intensities were included in the equations by means of a lognormally-distributed error term, also known as a "residual."

Recent studies of these ground motion residuals show that, rather than being randomly distributed through an area during an earthquake, there is a distinct correlation between residuals at one site and residuals at nearby sites. Observations have shown that if the ground motion is higher than expected at a particular site, it is more likely that a nearby site will also experience higher-than-expected ground motion.

Because the USGS national seismic hazard maps are designed to capture the hazard at any given single site, the focus of the USGS and developers of the NGA equations has not been on correlated ground motion. However, such correlation has important implications for *portfolios* of properties held by insurance providers. For example, these pockets of high or low ground motion may be very large and encompass an entire metropolitan area. When a higher-than-expected ground motion pocket occurs in a densely populated area, the losses will be much larger than expected everywhere in that area. The converse is true when a lower-than-expected ground motion pocket occurs in a densely populated area.

The AIR model explicitly takes into account the effects of site-to-site correlation of ground motion intensity measurements when estimating the loss due to seismic activity for spatially extended portfolios.[8, 9] The modeling of ground motion correlation by AIR is therefore a departure from the USGS maps.

Figure 51 provides a visual illustration of ground motion correlation. Figure 51a shows a recreation of the 1994 Northridge earthquake's ground motion footprint using the latest NGA equations without modification. Figure 51b is considerably

[8] For further technical details, see P. Bazzurro et al., "Effects of Spatial Correlation of Ground Motion Parameters for Multi-Site Seismic Risk Assessment: Collaborative Research with Stanford University and AIR" available on the USGS website at http://earthquake.usgs.gov/research/external/reports/07HQGR0032.pdf.

[9] For further details on the methodology used by AIR to simulated ground motion with spatial correlation, see Park, J., Bazzurro, P. and J.W. Baker "Modeling Spatial Correlation of Ground Motion Intensity Measures for Regional Seismic Hazard and Portfolio Loss Estimation," *Proceedings of ICASP10* (Tokyo, Japan, July 31-August 4, 2007)

more complex because it takes output from the NGA equations and modifies it using information on soils and basin effects. Figure 51b represents median ground motion as calculated by the AIR model. Figure 51c, however, is the best estimate of “actual”, or observed, ground motion taken from the USGS ShakeMap. (For more about ShakeMap see “Using ShakeMap for Damage Function Calibration” in Section 5.8.)

While the overall comparison between Figure 51b and Figure 51c is reasonably good, the actual ground motion footprint reveals pockets of very high concentrations of ground motion. In this case, the pockets are located in heavily populated areas, which led to losses that were much higher than would otherwise be expected from an earthquake of Northridge’s magnitude (M6.7) and epicentral location.

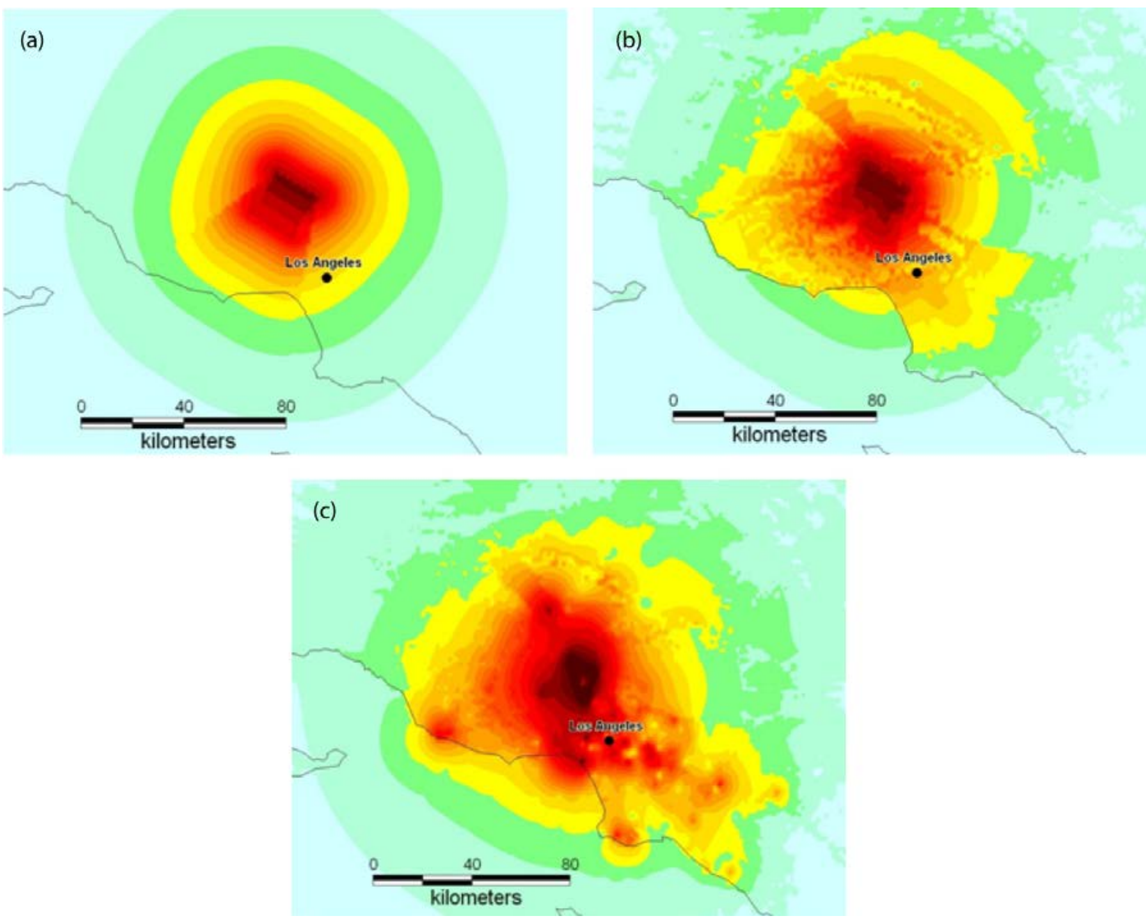

Figure 51. USGS TriNet Map for the Northridge Earthquake (top left), Expected Ground Motion (top right), and the Ratio (bottom) Showing Spatial Correlation of Residuals

The impact of these spatial patterns and the interaction with the distribution of risks or assets in a portfolio can generate very different loss estimates. Indeed the next earthquake that occurs, even if it occurs on the Northridge fault, is not going to look like the map in Figure 51c. Using actual ground motion recordings as well as the spatial correlation model, the AIR model can generate ground motion footprints of any historical events that are consistent with recorded peak ground motion parameters. By generating these accurate and consistent simulated maps dozens or even hundreds of times, the model produces a realistic distribution of losses and one that is consistent with observed losses.

Figure 52 shows an example of this concept, again applied to the 1994 Northridge earthquake. The figure shows four of 50 simulated ground motion maps of the Northridge earthquake that are consistent with recorded ground motions and allow for spatial correlation. The chart on the right shows the resulting loss distribution from all 50 simulations. The observed (reported) losses for Northridge fall very close to the middle of the distribution.

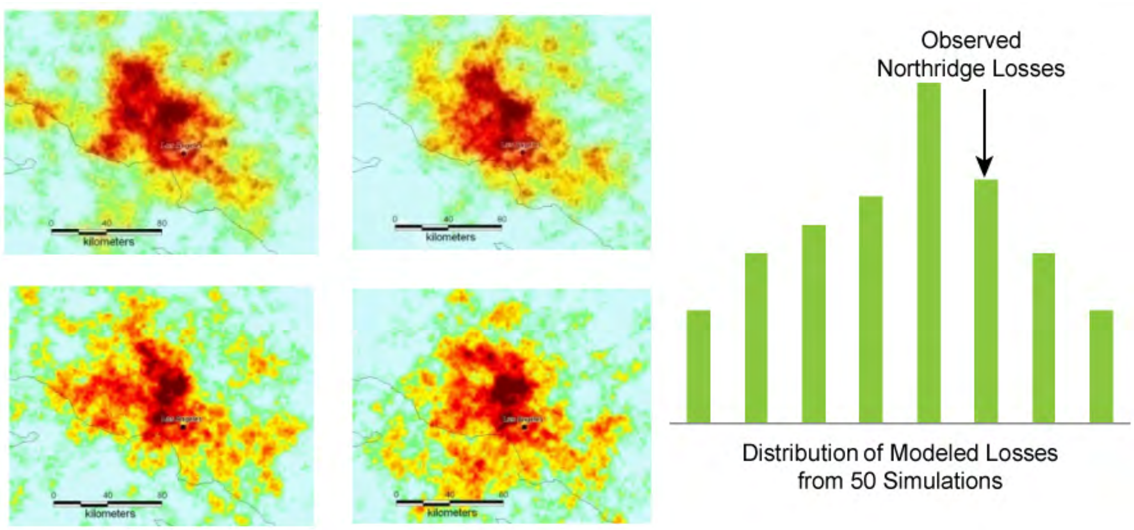

Figure 52. Multiple Ground Motion Maps with Spatial Correlation and the Corresponding Distribution of Modeled Losses for the 1994 Northridge Earthquake

Effects of Spatial Correlation on Portfolio Losses

As mentioned earlier, site-to-site correlation increases as the distance between the sites decreases, producing pockets of unexpectedly high or low ground motion. This of course means that the correlated residuals have a greater effect on clustered exposures, which has important implications for portfolios of properties. For example, the pockets of high or low ground motion may be very large and encompass an entire metropolitan area. When a high ground-motion pocket occurs in a densely populated area, the losses will be much larger than expected everywhere in that area. The converse is true when a lower-than-expected ground motion pocket occurs in a densely populated area.

While large portfolios that are distributed over a large area will, in general, be less affected by spatial correlation than smaller, more concentrated portfolios, in both cases failure to account for ground motion correlation will underestimate the probability of both very high and very low losses, the former being the more serious matter.

Figure 53 shows the impact on the loss exceedance curve. When ground motion uncertainty is considered with spatial correlation, the annual exceedance probability tends to drop more steeply for frequently exceeded losses, thereby lowering the overall losses in this part of the curve. However, the annual exceedance probability then levels and extends farther to include the larger and less frequent losses. Because the exceedance probability curves generated using spatial correlation are based on many more simulations and hence more information, they are more robust—particularly in the tails of the distribution.

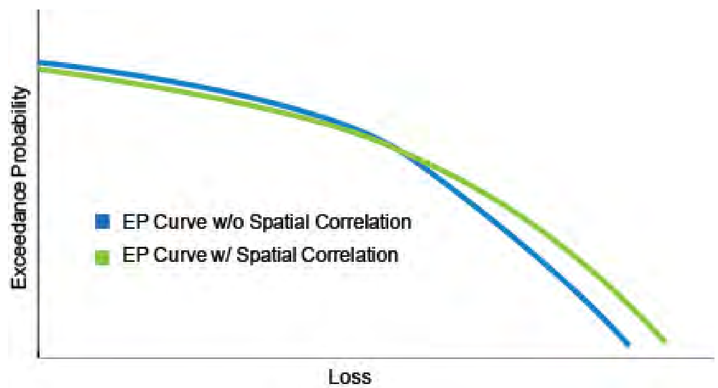

Figure 53. Loss Exceedance Curves with (Green) and without (Blue) Spatial Correlation

4.6 Validating Local Intensity Calculations

This section provides a variety of exhibits illustrating the comprehensive process undertaken by AIR researchers to validate the local intensity module of the AIR Earthquake Model for the United States.

Validating the NGA Equations

As discussed in Section 4.2, the next generation attenuation (NGA) equations implemented by the USGS in the 2008 seismic hazard maps were developed based in the largest, most robust database of ground motion recordings available—a database more than three times larger than had previously been available. In turn, the NGA equations are more reliable and scientifically defensible than any previously produced.

Because the NGA equations themselves have been thoroughly validated by their developers, AIR's implementation of them in the model validates AIR's approach to ground motion modeling.

Figure 54 and Figure 55 show median ground motion and one standard deviation as generated by the NGA equations for the 1989 Loma Prieta and 1994 Northridge earthquakes, respectively.

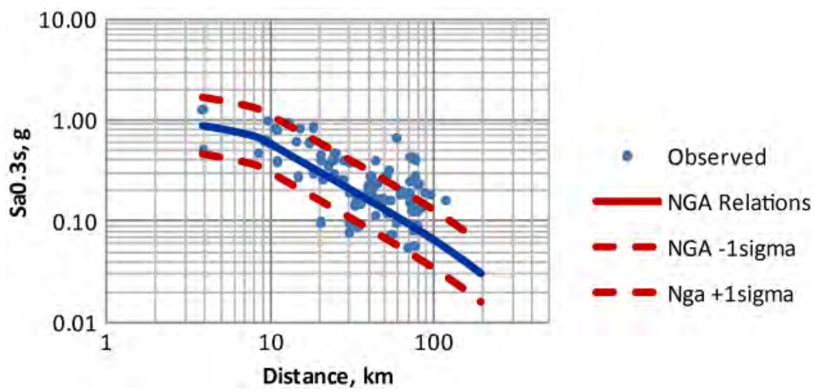

Figure 54. Comparison between Observed and NGA Predicted Mean Ground Motion with Uncertainty for the 1989 Loma Prieta Earthquake

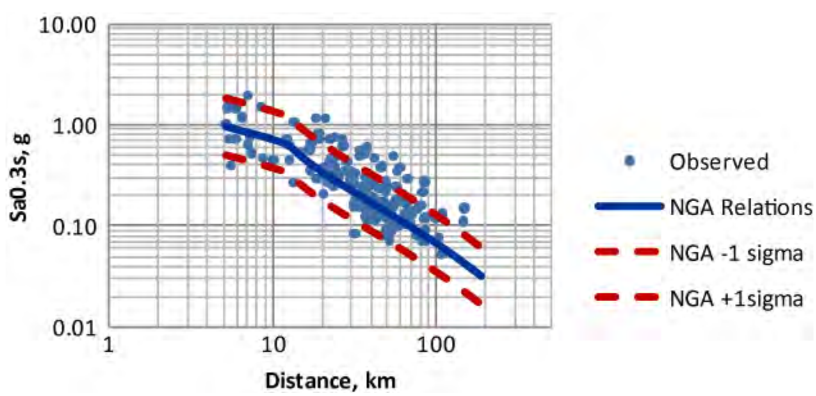

Figure 55. Comparison between Observed and NGA Predicted Mean Ground Motion with Uncertainty for the 1994 Northridge Earthquake

What we see in the Northridge comparison is the higher-than-expected ground motion for the Northridge event due to spatial correlation (localized "hot spots" in areas of high exposure) as discussed above in Section 4.5. The NGA attenuations show here reflect the median of the ground motion of many earthquakes.

Comparing AIR and USGS Ground Motion Hazard

To validate the modeled earthquake hazard, the details from earthquakes at locations across the entire country were compared to data recorded by the USGS. This validation is based on both the distribution of events and the ground motion for each event.

For each of the cities, whose locations are shown in Figure 56, AIR computed the hazard using the 475-year return period ground motion hazard in terms of the peak ground acceleration (PGA), the 0.3 second spectral acceleration (for high-frequency, low-rise, rigid structures), and the 1.0 second spectral acceleration (for flexible structures).

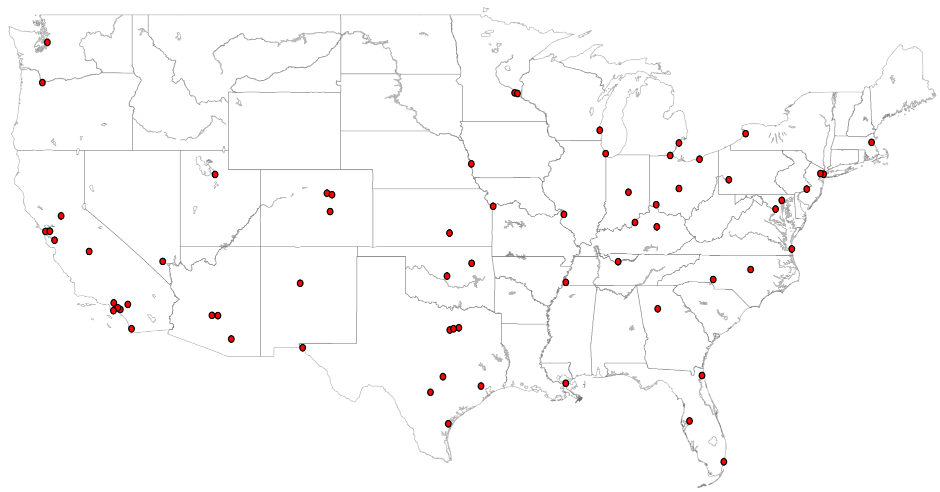

Figure 56. U.S. Locations Used for Ground Motion Validation

As can be seen in Figure 57, Figure 58 and Figure 59, the clustering of data points near the 45-degree line indicates consistency between the AIR and USGS models. There are subtle differences, but the deviations are within an acceptable range, given the complexity of the hazard calculations.

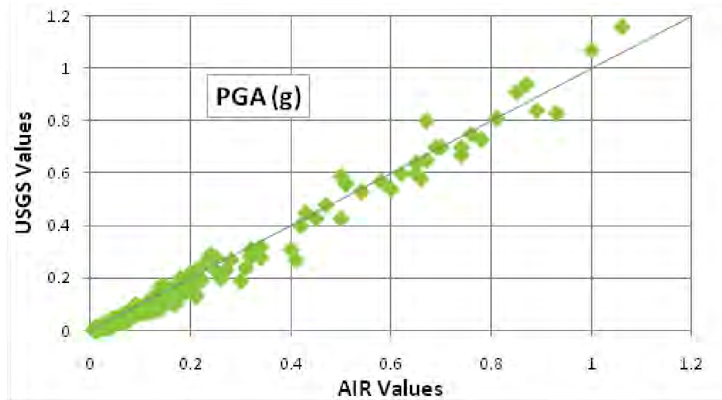

Figure 57. USGS vs. AIR 475-Year Return Period PGA Values

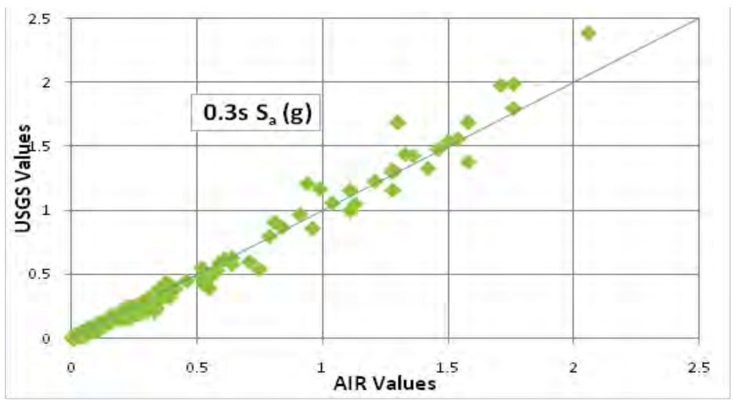

Figure 58. USGS vs. AIR 475-Year Return Period 0.3 s S_a Values

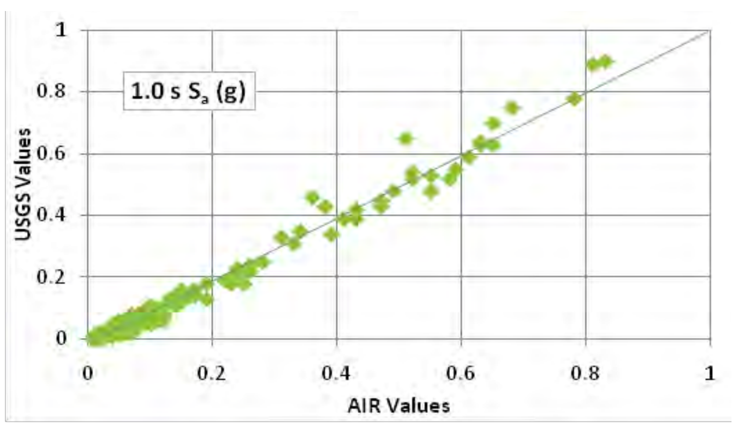

Figure 59. USGS vs. AIR 475-Year Return Period 1.0 s S_a Values

Validating the Liquefaction Module

Because it is difficult to separate the damage caused by shaking from damage caused by liquefaction in claims data, the best method for validating the liquefaction model is by comparing it to historical occurrences of liquefaction due to earthquakes.

The following figures show the liquefaction severity for simulated historical events at ZIP Code resolution, along with observed liquefaction sites from the actual historical earthquakes. In the figures, liquefaction severity refers to the amount of settlement and shifting of the soil that takes place, which depends on both the liquefied state of the soil and the amount of shaking amplification that takes place due to the soil conditions.

For the Loma Prieta earthquake of 1989, observations of liquefaction occurred around San Francisco; however the earthquake rupture was farther south (outside the area shown in Figure 60) and liquefaction farther south may not have been recorded as accurately, due to the wetlands in that area. The simulations of possible liquefaction severity coincide with observed sites in urban areas, but also show more damage south of these sites. This is due to both the water depth table data and simulated shaking from the earthquake itself.

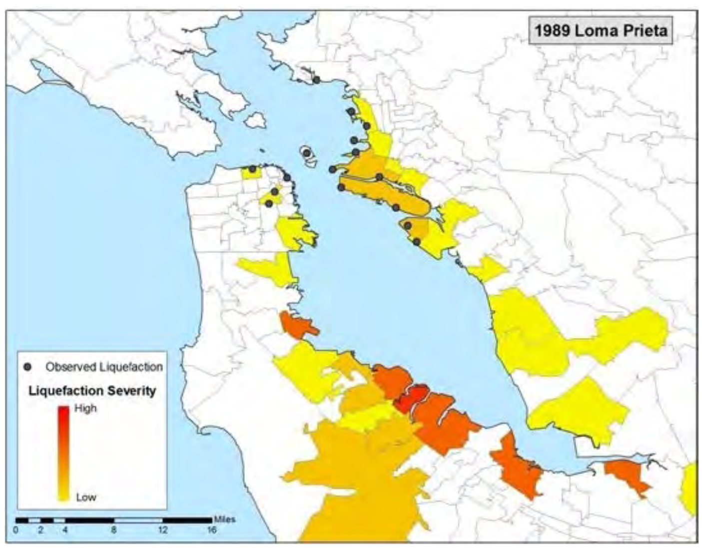

Figure 60. Simulated Liquefaction Severity and Observed Liquefaction Sites, 1989 Loma Prieta Earthquake

The observed liquefaction sites from the San Francisco earthquake of 1906 are consistent with simulated locations (Figure 61). The simulation shows the heaviest severity in almost the same areas as the simulation for Loma Prieta.

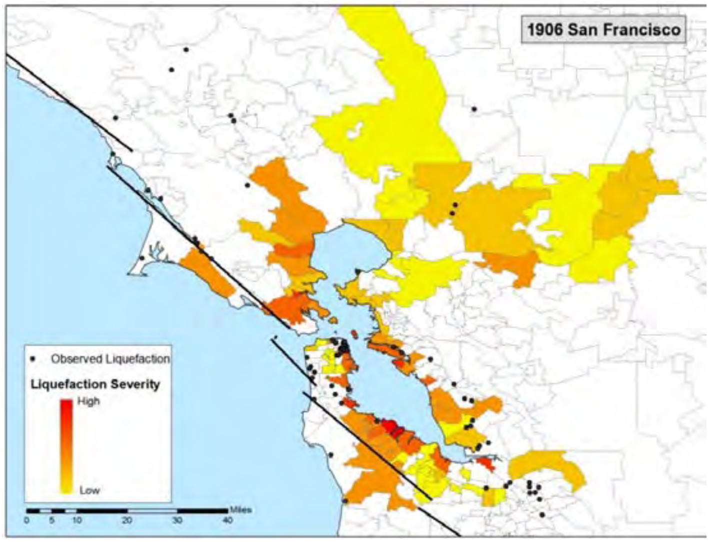

Figure 61. Simulated Liquefaction Severity and Observed Liquefaction Sites, 1906 San Francisco Earthquake

The observed liquefaction sites from the Northridge earthquake of 1994 show a very good consistency with simulated locations, as shown in Figure 62.

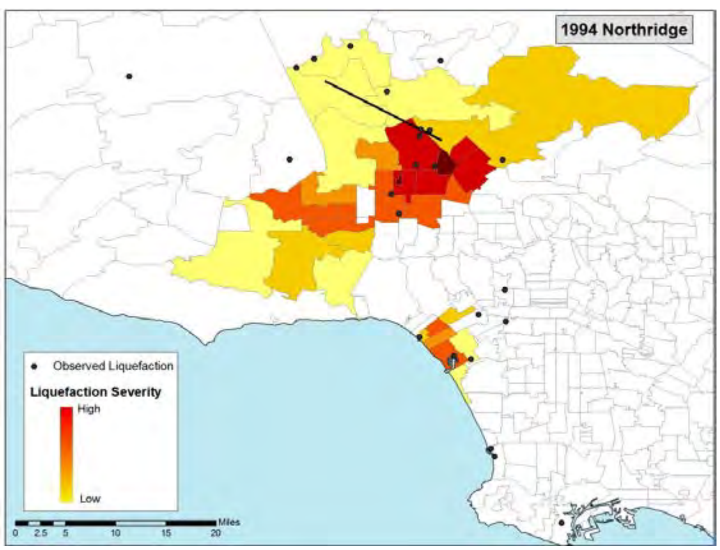

Figure 62. Simulated Liquefaction Severity and Observed Liquefaction Sites, 1994 Northridge Earthquake

The observed liquefaction sites from the Nisqually earthquake of 2001 show a very good consistency with simulated severity (Figure 63). As in the Loma Prieta earthquake, the areas immediately next to the rupture are less prone to liquefaction damage than sites farther away that have the soil and groundwater conditions that can lead to liquefaction during an earthquake.

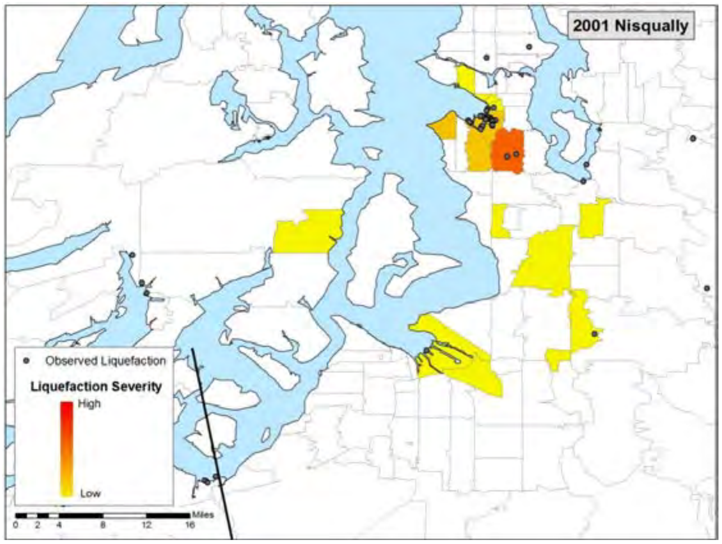

Figure 63. Simulated Liquefaction Severity and Observed Liquefaction Sites, 2001 Nisqually Earthquake

5 Damage Estimation

The vulnerability module of the AIR Earthquake Model for the United States estimates losses caused by ground shaking to residential, commercial and industrial assets, buildings under construction (100- and 300-series) and to automobiles. In addition, the model takes into account the possibility of losses caused by soil liquefaction as a result of ground shaking, and by fire that may ignite as a result of earthquake damage (ruptured electrical and gas lines, chemical spills, damage to tanks and oil refineries, etc.).

Damage functions are used to compute the losses to assets of different construction classes. A damage function is a statistical relationship between the intensity of the ground motion and the fraction of the replacement cost of the asset that is needed to repair the damage. This fraction is known as the damage ratio (DR). Damage functions differ for assets belonging to different construction classes and are formulated based on characteristics of the asset (e.g., construction materials, lateral force structural resisting system, building height, and vintage) that affect the asset's vulnerability to ground shaking.

The ground motion intensity parameters used in the model to predict building performance vary by construction type and height, as shown in Table 11. Using different measures of intensity allows the model to exploit the higher correlation between different ground motion intensities and responses of various building classes.

Table 11. Independent Variables for Different Construction Classes

Construction Class	Height	Independent Variable
Wood Frame	Low-Rise	S_a(0.3s)
Masonry Veneer	Low-Rise	S_a(0.3s)
Unreinforced Masonry – Bearing Wall and Frame	Low-Rise/Mid-Rise	S_a(0.3s)
Reinforced Masonry Shear Wall–With and Without MRF	Low-Rise/Mid-rise	S_a(0.3s)
	High Rise	S_a(1s)
Reinforced Concrete Shear Wall–With and without MRF; Reinforced Concrete MRF–Ductile and Non-Ductile; Tilt-Up and Pre-Cast Concrete	Low Rise	S_a(0.3s)
	Mid-Rise	S_a(1s)
	High Rise	S_a(3s)
Light Metal, Braced Steel Frame, Steel MRF–Perimeter and Distributed	Low-Rise/Mid-Rise	S_a(1s)
	High Rise	S_a(3s)
Long-Span	N/A	S_a(3s)
Mobile Homes, Industrial Facilities (400+ class) and other Construction Classes (200+)	N/A	PGA

Note that not all the height classes in the table are applicable to all construction classes. For instance, mid-rise and high-rise heights are not applicable to tilt-up and light metal buildings.

5.1 Building Classification

This section describes some of the most prominent of these classes, and how each is affected by ground shaking due to earthquakes.

Wood Frame Construction

In the continental United States, the residential building stock is dominated by wood frame construction. About 98% of all types of homes in the earthquake-prone west, from low-cost subsidized dwellings to mansions, are wood frame structures. In addition to residential assets, a significant percentage of commercial structures are wood frame as well. The AIR Earthquake Model for the United States supports two types of wood structures: wood frame, and wood frame with masonry veneer.

Several historical events brought about changes in wood frame construction practices including World War II, the post-war economic and construction boom, the constantly evolving standard of living, and the adoption of modern construction methods such as mass production. However the most significant events that have affected the current building codes for wood frame construction are the earthquakes that occurred along the West Coast over the last 100 years. During this time, each earthquake brought about new lessons, which have since been incorporated in building codes in an effort to improve the seismic performance of these structures.

A typical modern wood frame home in the United States has one to three floors, and sometimes includes a basement. The foundations are often made of a concrete slab-on-grad or, in the case of some older wood frame houses, of spread concrete footings. The exterior walls are finished with stucco, wood siding or shingles, vinyl, or aluminum cladding. Interior walls in older homes are usually finished with plaster; in newer ones they are finished with gypsum boards. The pitched roofs on homes of all ages are usually covered by shingles or tiles, and newer homes sometimes have composition shingles. Flat roofs are usually covered by tar and gravel.[10]

[10] For a detailed examination of wood frame housing construction, see *Review of Structural Materials and Methods for Home Building in the United States: 1900 to 2000,* U.S. Department of Housing and Urban Development (Washington, DC) prepared by National Association of Home Builders (NAHB) Research Center (Upper Marlboro, MD, 2001)

Masonry Construction

Another common type of construction used for residential and commercial dwellings in the United States is masonry. For modeling purposes, AIR divides masonry into two categories: unreinforced masonry and reinforced masonry.

Unreinforced masonry (URM) buildings include structures that do not have any reinforcement steel within the load-bearing masonry walls. As a result, these structures have limited lateral load-resistance capacity and are very vulnerable to the lateral loads generated by earthquakes. This poor performance of URM structures has been observed in all past earthquakes. In 1986, the California Seismic Safety Commission enacted the "URM Law" in order to reduce the vulnerability of these structures. This law requires the local governments in the state's highest seismic hazard regions (defined as Zone 4 in the now obsolete Uniform Building Code) to retrofit URM buildings following specific guidelines. In the eastern part of the country, new construction of unreinforced masonry is still permitted and URM structures are more common.

Reinforced masonry (RM) contains load-bearing walls of brick or concrete block masonry reinforced by steel bars. The reinforced brick, or reinforced hollow concrete block shear walls, which extend from the foundation to the roof, provide lateral load-resistance to the structure. Although the performance of modern reinforced masonry structures is likely to be similar to the modern engineered construction of reinforced concrete structures, older RM structures can have enough deficiencies to perform as badly during earthquakes as URM structures. The deficiencies that affect their performance depend on the construction practices that were in place in a particular region at a particular time. For example, the quality of the grout depends on its age and determines the strength of the bond between reinforcement steel and masonry. High-quality grout is instrumental in providing good lateral resistance during earthquakes.

Steel and Concrete Construction

Steel and reinforced concrete is used for a large number of commercial and industrial buildings, and for residential apartment buildings. These structures consist of steel or reinforced concrete elements (e.g., beams, columns, and shear walls), which make up the primary lateral load-resisting system. These elements as well as the partition walls, façade, floors, etc., of these structures are generally designed and constructed according to similar guidelines, so their performance during earthquakes is usually more uniform than that of the non-engineered wood-frame construction. However, the configuration and the construction methods used for the primary lateral load-resisting systems of these structures vary considerably between different building classes. As a result, typical buildings belonging to these classes may show significantly different behavior during ground shaking. For example, reinforced concrete buildings with shear walls usually respond better to ground shaking than reinforced concrete frame buildings.

5.2 Impact of Regional Construction on Building Vulnerability

The AIR Earthquake Model for the United States takes into account regional variations in building vulnerability, which are due to the different design requirements and construction practices. Therefore, AIR developed distinct damage functions for the three areas of the country with distinctly different hazard levels: California, Washington and Oregon, and all other states.

The model takes into consideration the building codes adopted in each area over time. For the purpose of deriving damage functions for different construction types, in California, a "high code" is used due to more rigorous seismic design requirements, in Washington and Oregon a "moderate code" is used, and in the rest of the country, a "low code" is used. Structures built before 1940 are considered to be "pre-code."

The awareness for earthquake-resistant design and construction is higher in California, and seismic guidelines for building codes were adopted earlier in earthquake-prone counties. Therefore, buildings in California generally perform better than comparable buildings in other regions when subjected to the same level of ground shaking. Historically, there has also been some awareness of earthquake-resistant design in Oregon and Washington, and many structures there have been designed with earthquakes in mind. However, in the remainder of the country, buildings have been primarily designed only for gravity loads and, in some cases, wind loads. In all these states, for many categories of buildings, the design of the lateral load resisting system is controlled by design wind loads rather than earthquake loads.

Lateral load resisting systems for wind loads provide resistance from seismic loads as well. Therefore, when assessing the lateral strength of a building for damage function development purposes, the AIR model takes into consideration design wind loads throughout the entire continental U.S. This plays an important role for the development of damage functions in the eastern US, especially along the coast, where although the buildings are not designed for earthquakes, the wind load design helps these structures to resist the lateral loads from earthquakes.

5.3 Impact of Year Built on Building Vulnerability

A building's age plays a significant role in its vulnerability, especially for concrete structures. The reinforced concrete (RC) structures that were built in California before 1975 are generally very brittle and are therefore unable to accommodate large deformations that may be generated by intense ground shaking. Hence, these structures have a higher risk of collapse than those of similar construction built more recently. Other nonductile structures include RC frames that are designed to withstand gravity loads only, which are quite common in the central and eastern parts of the United States. For steel structures, age is not as important, although older steel structures are generally more vulnerable than newer ones. For example, many steel moment-resisting frame buildings built in southern California before 1994, which engineers considered to be almost indestructible, are unexpectedly brittle and incurred fractures in the steel column-beam connections during the M6.7 Northridge earthquake. Steel moment-resisting frame buildings designed and built after 1994 are expected to behave in a more ductile manner and show improved seismic performance.

A building's age typically identifies the building code that guided its design, and the construction techniques that were used when it was built. Thus older buildings are generally more vulnerable to shake damage than newer ones, since newer codes tend to have stricter design guidelines and are more rigorously enforced.

In the AIR Earthquake Model for the United States, the age bands for engineered construction, such as steel and reinforced concrete buildings, reflect the evolution of the seismic code provisions and are supported by the findings of post-earthquake damage reconnaissance reports. The age bands for non-engineered (or less engineered) construction classes, such as wood frame, were derived with more emphasis on the damage and loss data caused by historical earthquakes rather than by the evolution of code regulations.

It is interesting to note that for non-engineered (or less engineered) structures newer does not necessarily imply better seismic performance. For example, during the 1994 Northridge earthquake, wood frame buildings dating from the 1940s and 1950s performed, on average, better than those built in the 1960s. This is mainly because earlier houses were generally smaller in size, with smaller rooms and smaller and fewer openings in the façade, and had simpler plans and vertical layouts. The buildings in the 1960s were architecturally more daring with more open layouts, larger rooms, and large wrap-around windows, which are characteristics that compromised their seismic performance.

Figure 64 shows the average damage ratio for five different age bands ($S_a(0.3s)$ = 0.75-1.25g), based on a statistical study of an extensive set of data from a claims database. The damage ratios are for wood frame structures in California that were damaged during the 1994 Northridge earthquake.

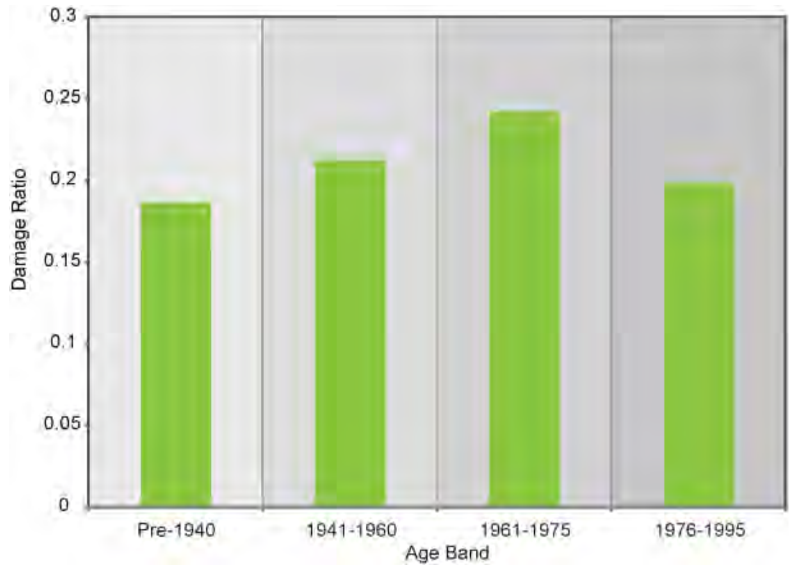

Figure 64. Damage Ratios of Wood Frame Structures of Different Ages after the 1994 Northridge Earthquake

The AIR model uses age bands that consolidate the results of all the building code review effort and statistical studies of damage and loss data from AIR engineers.

Note that the age bands are not identical for the same construction classes in different regions of the United States, since codes and construction practices were not uniformly adopted at the same time across the country.

5.4 Building Damage Functions

The damage functions implemented in the AIR model correlate an appropriate ground-motion intensity measure with the building damage ratio (the ratio of the building's repair cost to its replacement value).

If an infinite amount of damage and loss data, including records of ground motion at each building location, were available for buildings of all construction classes and age bands, then the derivation of damage functions would only entail a statistical exercise involving regression techniques. However, such large databases are not available, for several reasons, the primary one being that damaging earthquakes do not occur frequently enough to provide extensive data. The result is that data is generally scarce and the data that do exist is often poorly recorded. Therefore, the most accurate damage functions for all construction classes, all age bands, and all regions, can only be derived using a combination of engineering and statistical tools.

Hence, the AIR damage functions are based on engineering analyses, damage data collected after historical earthquakes, claims data at both property and aggregated levels, loss estimates for past earthquakes, and a careful evaluation of the prescription in the building codes. The balance in the adoption of these tools varies with different construction classes.

All engineering analyses performed for the purpose of evaluating the response of a building to different levels of ground shaking follow the conceptual flow-chart depicted in Figure 65.

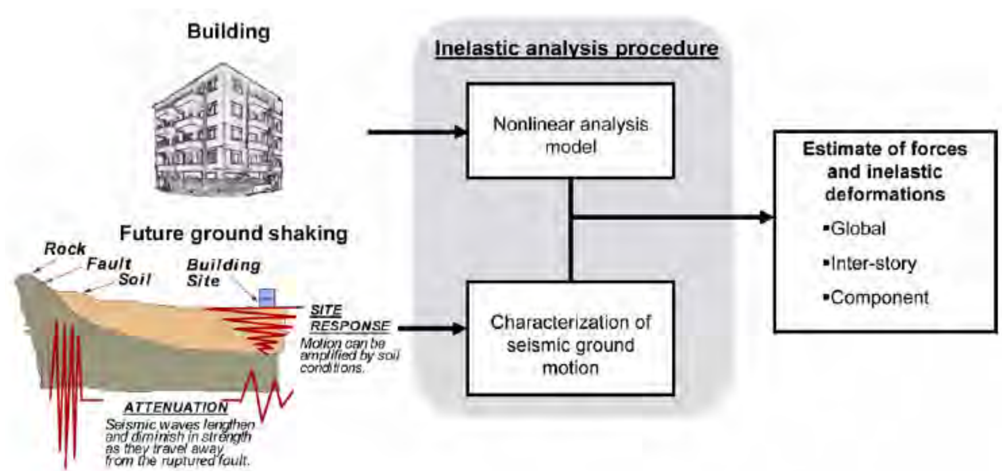

Figure 65: Conceptual Flow of Analyses Adopted for Building Damage Functions (adapted from FEMA 440)

The engineering analyses require the use of a computer representation of a building, and of the characterization of ground motions that such a building may be subjected to in the future. The following sections discuss in some detail the nonlinear analyses that can be performed to estimate the response of the building (i.e., mostly induced deformation such as roof and story drifts but also forces in structural members) when subjected to different ground motion intensities.

5.5 The Capacity Spectrum Method and the Use of Nonlinear Static Analysis

To estimate a building's response to different levels of ground shaking, a computerized model of the building is subjected to a lateral load pattern that represents the force generated by the ground motion (see Figure 66). This lateral load pattern, or load vector, is chosen to have the same shape as the fundamental mode of the structure's vibration. The total load is then increased in successive steps to create a relationship between the intensity of the applied load (measured in terms of base shear) and the deformation of the building (measured in terms of roof drift). The analysis terminates when the building (virtually) collapses. This static nonlinear procedure is often called pushover analysis and the force/deformation curve obtained is called a pushover curve.

When one is interested in predicting the response of a building to a specific ground motion in an expedited manner, then an available analysis method is the Capacity Spectrum Method (CSM), in which the quantities in the full building pushover curve are transformed into response measurements of an equivalent single-degree-of-freedom oscillator, such as the pendulum shown in Figure 66. The oscillator has the same natural frequency and degraded stiffness, after yielding, as that of the modeled building. More precisely, the applied load is translated into spectral acceleration, and the building deformation is translated into spectral displacement.[11] The pushover curve represented by these two parameters (which are related to the equivalent oscillator) is called the capacity curve. A building's capacity curve reflects various seismic characteristics of the building, such as its stiffness, its material brittleness or ductility, and its strength. This curve correlates the lateral deformation that a building is subjected to (in terms of spectral displacement) to a specific level of dynamic demand (expressed in terms of spectral acceleration).

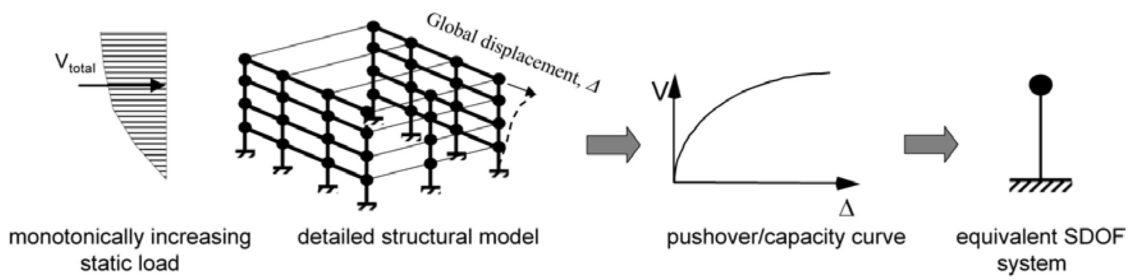

Figure 66: Schematic Depiction of Static Pushover Analysis used in the Capacity Spectrum Method (excerpted from FEMA 440)

As will be discussed later, any anticipated ground motion that may affect a building can be modeled in a more comprehensive form as a *time history* of ground acceleration. However, several simplified representations are also available to engineers, one of which is the response spectrum. In the response spectrum representation, which is convenient to use in the framework for the Capacity Spectrum Method, the demand on a building imposed by ground motion is represented by the maximum acceleration and displacement of a series

[11] Spectral acceleration and spectral displacement are two response measures of oscillators with given vibration period and damping.

of oscillators. The response of this collection of pendulums can be plotted as a curve of acceleration/displacement pairs known as the demand curve.

In Figure 67, a series of simple oscillators are subjected to ground shaking. The peak responses of the oscillators are plotted on the graph to the right, showing the spectral acceleration against the spectral displacement. The radial lines on the graph represent the periods of the oscillators.

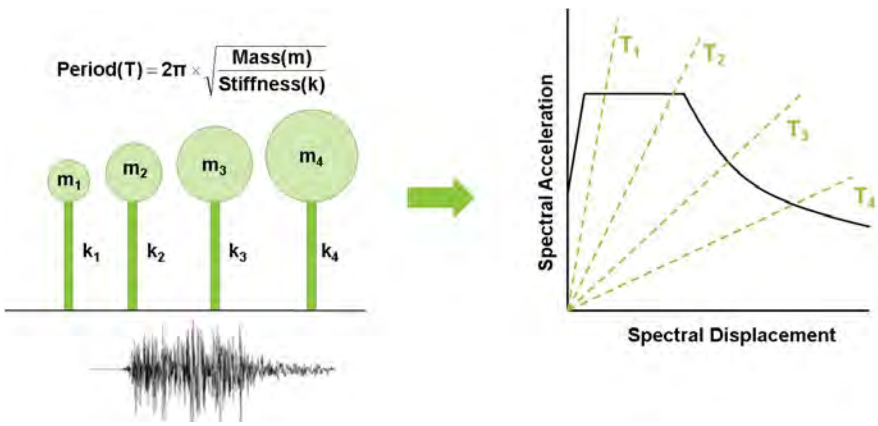

Figure 67. Maximum Acceleration and Displacement of a Series of Oscillators

The demand curve and the capacity curve are represented by the same parameters and can be plotted in the same figure. The intersection of the demand curve and the building capacity curve plotted on the spectral acceleration vs. spectral displacement plane corresponds, within a constant, to the maximum roof displacement of the building relative to the ground in response to that ground motion.

Figure 68 shows the intersection of the demand and capacity curves, which represents the peak response of the structure.

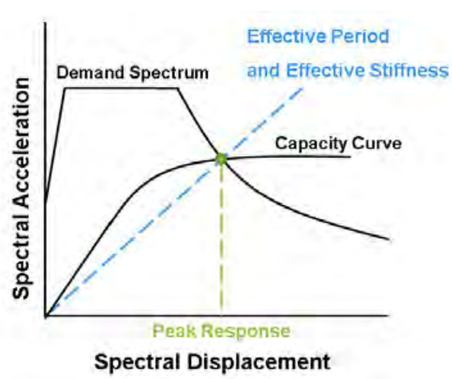

Figure 68. The Peak Response of a Structure Determined by its Capacity Curve

A capacity curve representing a single building of a certain construction class will have a unique intersection with different response spectra for different ground motion intensities. Similarly, different capacity curves representing different buildings of the same class will have unique intersections with the same response spectrum from a given ground motion intensity, as illustrated in the left panel of Figure 69. These attributes provide the ability to distinguish between the responses of various building classes to different ground motion intensities.

During ground shaking, the amount of deformation incurred by the different stories of a building can be derived, given certain assumptions, from the deformation at the roof level. The story deformations can be related to the damage suffered by all types of components, both structural (e.g., columns and beams) and non-structural (e.g., cladding, partitions, ceiling tiles, etc.) at each story and, therefore, to the repair strategies that are expected due to the predicted damage. The repair strategies for each damaged component can be priced and expressed in terms of a fraction of the replacement cost of the entire building.

Therefore, each intersection between a ground motion demand curve and a building capacity curve generates one point of the damage function for that building; the entire damage function is subsequently generated from multiple intersections. The right panel of Figure 69 shows conceptual damage functions generated for three buildings: A, B, and C, which belong to the same construction class. This is the essence of the Advanced Component Method (ACM), which AIR introduced in 2000. A similar approach has also been adopted in the current version of the model for developing damage functions for a few construction classes for which damage data, or claims data, or detailed nonlinear time-history analysis results are not available.

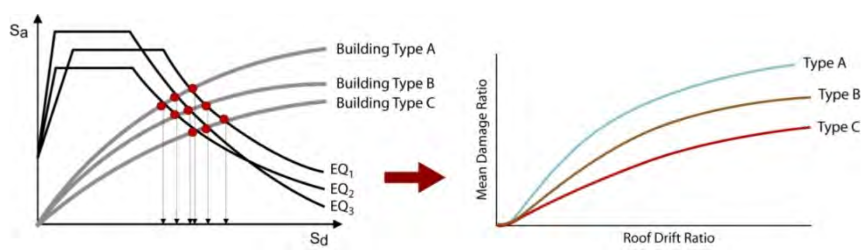

Figure 69. Maximum Displacement and Building Damage Depends on Ground Motion and Building Characteristics

5.6 Nonlinear Dynamic Analysis

The capacity spectrum method, which uses pushover analysis for assessing responses of buildings to ground shaking, is a perfectly viable analysis technique for addressing the inelastic response of buildings that respond predominantly in the fundamental mode of vibration. However, because of its inherent assumptions, CSM analysis may lose accuracy in predicting the seismic response of long-period buildings, whose higher modes of vibration need to be considered, and of other buildings with complex post-elastic behavior. In particular, pushover analysis has been shown to overestimate the displacement of brittle structures, especially stiff ones (e.g., old, low- and mid-rise concrete buildings) and of stiff, ductile structures (e.g., wood frames), and to underestimate the displacement of flexible, ductile structures (e.g., high-rise steel buildings).

With the release of the current model, AIR engineers have taken yet another step in the advancement of objective, engineering-based earthquake vulnerability assessment with the introduction of nonlinear dynamic analysis (NDA) to replace static pushover analysis. Computationally very expensive and practicable only as a result of major advances in computing power, NDA is today the current state-of-the-art methodology for predicting building response to earthquake ground motion.

The framework within which NDA is incorporated is the same as in ACM**.** The primary difference is in how the relationship between ground motion intensity and building response is established.

As with CSM (and ACM), the first step in NDA analysis is to create a computer representation of a building that captures the nonlinear post-elastic behavior of a building's structural elements that undergo damage (see Figure 70). A large number of historical ground motion records of varying intensities are loaded into the software to perform time-history (dynamic) analysis. Essentially, the virtual building is shaken (rather than pushed) using the recorded ground motions in the same way that it would be shaken by an actual earthquake.

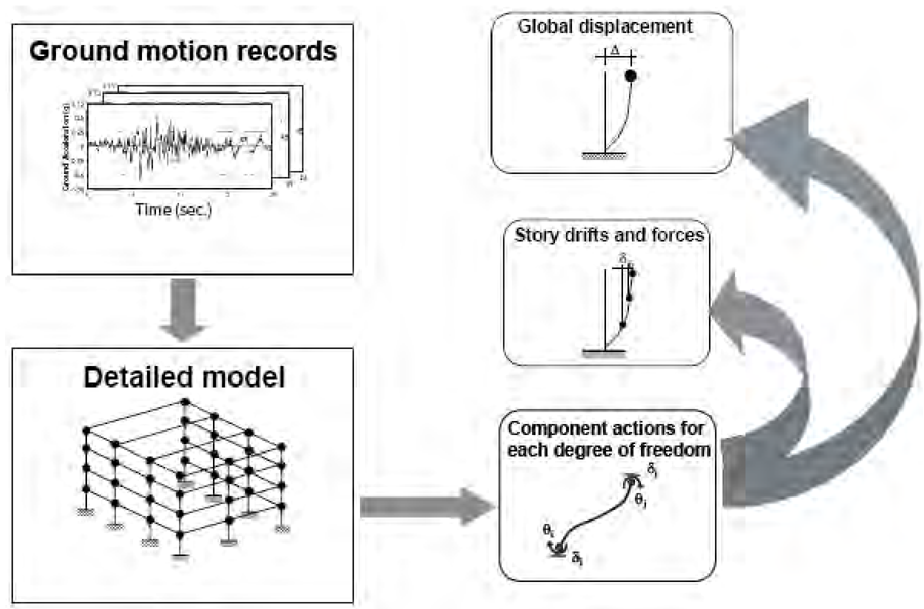

Figure 70. Flow Chart Depicting the Use of NDA to Determine Building Response (Excerpted from FEMA 440)

The use of time-history analysis allows an explicit consideration of the effects of the duration of the earthquake shaking on the cumulative damage of building components. In each analysis, the forces and deformations occurring in all structural members of the model are computed and used to evaluate the global response measures such as maximum peak inter-story drifts and forces, roof displacement, and peak story accelerations.

An example of the estimates of maximum peak inter-story drift and maximum peak floor acceleration obtained via NDA by applying ground motions from 100 earthquakes to a 10-story steel moment-resisting frame building is shown in Figure 71 below. The peak inter-story drift is the highest lateral displacement between two consecutive floors, normalized by the inter-story height. The *maximum* peak inter-story drift is the maximum drift among all stories that is observed over the entire duration of the earthquake. This quantity is well correlated with the damage of structural elements (e.g., beams and columns) and of deformation-sensitive non-structural elements (e.g., wall partitions). The peak floor acceleration (PFA) is the highest acceleration of a particular floor in response to ground shaking. Similarly, the *maximum* peak floor acceleration is the highest PFA found along the entire height of the building. This quantity is well correlated with damage to acceleration-sensitive nonstructural components (e.g., suspended ceilings), and to contents.

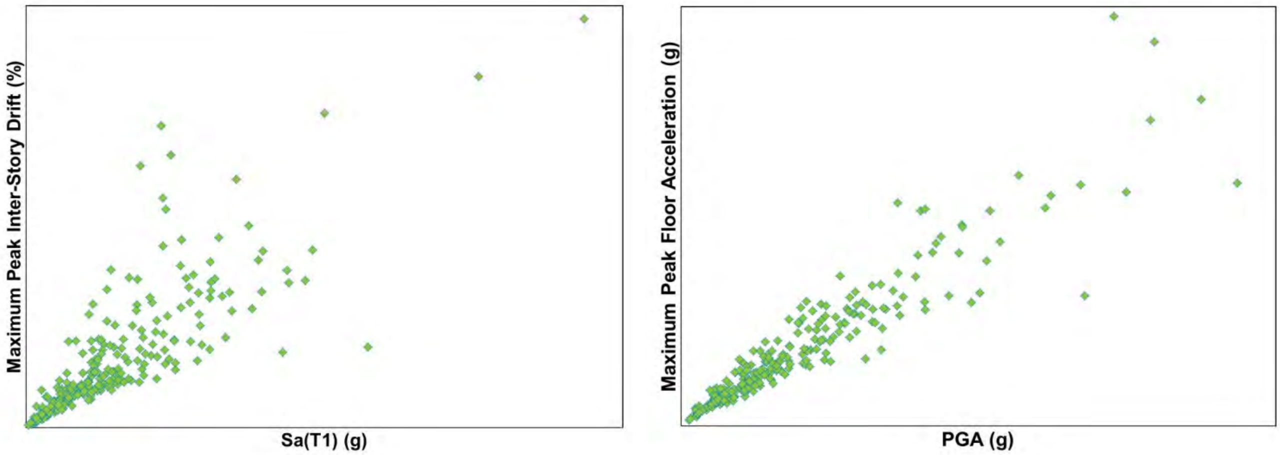

Figure 71. Maximum Peak Inter-Story Drift Ratios (MIDR) and Maximum Peak Floor Accelerations (MPFA)

Regression analysis can then be performed on the results in Figure 71 to establish the best relationships between the ground motion intensity parameters (e.g., spectral acceleration at the fundamental period of the building or Sa(T), and its peak ground acceleration or PGA) and the building's global response measurements (e.g., maximum peak inter-story drift and maximum peak floor acceleration). Note that a special statistical treatment was applied to account for ground motions that cause the complete collapse of the building (this response is not shown in the figure below). The use of ground motions from multiple earthquakes allows the model to obtain not only an estimate of the mean response given a certain level of ground shaking, but also allows it to account for the variability in the buildings' nonlinear response generated by different records of the same intensity.

Figure 72 shows the expected maximum peak interstory drift and interstory drift at different stories found by regression analysis for the same 10-story steel moment-resisting frame whose responses to non-collapsing ground motions were shown in Figure 71. The figure shows the relationship between the global response parameters and the intensity of the ground motion when the collapse cases are (correctly) considered (solid lines) or disregarded (dotted lines). Collapse cases must be considered since the building will not withstand indefinitely large deformation without failing.

NDA directly provides, without any limiting assumptions, the force imposed on a building by ground motion. Deformation levels (or story acceleration levels, when necessary) are then used to determine component damage and the associated repair strategy, and the monetary loss for the entire building is estimated by combining component repair costs.

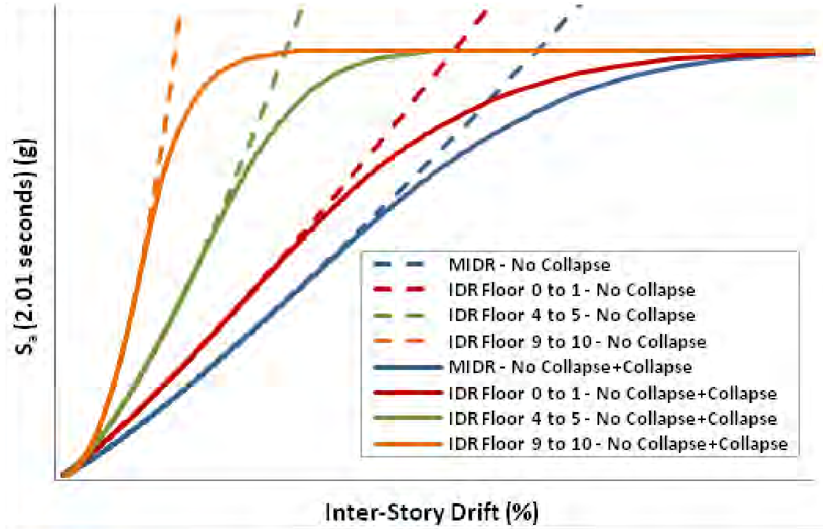

Figure 72. Relationship between Spectral Accelerations at the Fundamental Period of a Building and the Induced MIDR and IDR.

Note that with NDA, building deformation at each story is computed from a fully detailed model of the building. Because building response is calculated along the height of the building, NDA allows higher modes of vibration to be captured as well as different failure modes, as shown in Figure 73.

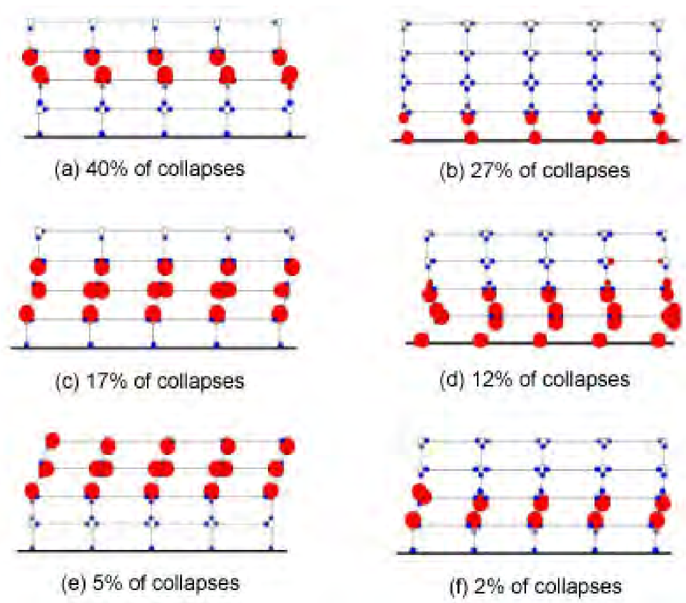

Figure 73. Six Failure Modes Captured by NDA for a Four-Story Concrete Moment-Resisting Frame Building (courtesy of Dr. Curt B. Haselton, California State University)

5.7 Development of Damage Functions for Different Construction Classes

As mentioned earlier, damage functions for different building construction classes are developed using a combination of tools that include engineering analyses, evaluation of building codes prescriptions, and damage and loss data.

Engineering analyses are more critical and, therefore, heavily used when empirical data is scarce. NDA was heavily used for the following types of buildings:

- Low-rise, mid-rise, and high-rise brittle and ductile reinforced concrete (RC) frame buildings in California
- Low-rise, mid-rise, and high-rise modern moment-resisting steel frame buildings throughout the continental United States

NDA was also considered, but to a lesser degree, for developing damage functions for wood frames in California, as will be discussed later.

For each of these construction classes, the nonlinear dynamic analyses were performed by both AIR engineers and other researchers, for multiple buildings within each class, to acquire an understanding of building-to-building response to similar ground shaking. The details of such engineering analyses were discussed in the previous section using an illustrative example of a 10-story steel moment-resisting frame building. NDA analyses performed for other buildings may differ in some details but they are conceptually equivalent to those described above.

For single-family wood frame (WF) residences in California, damage functions are based on engineering analyses, on claims data from the 1994 Northridge earthquake, and on damage and loss data from a number of historical events, including the 1989 Loma Prieta earthquake, the 2003 San Simeon earthquake, and the 2008 Chino Hills earthquake. About 98% of the residences in California are of wood frame construction.

The claims data for the Northridge earthquake include 450,000 policies filed with the California Department of Insurance (DOI) and another 27,000 policies from private insurers. The distribution of claims data from the private insurers is shown in Figure 74.

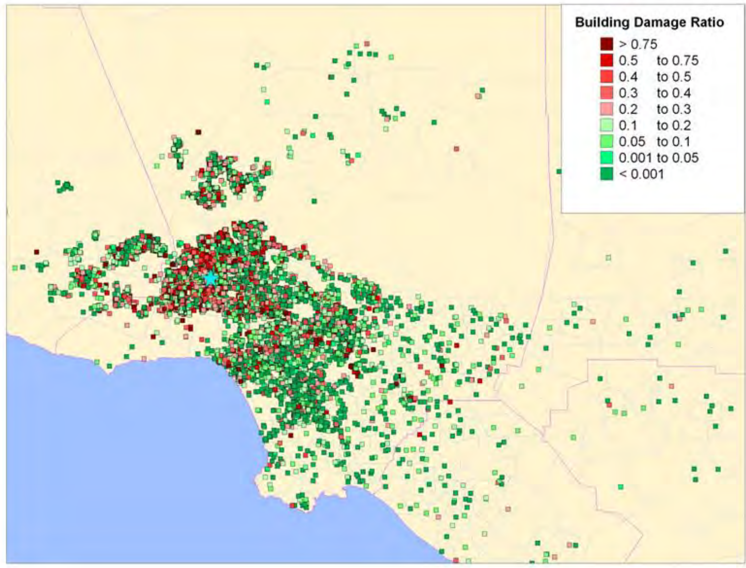

Figure 74. Claims Data from the 1994 Northridge Earthquake (Private Insurers)

When such claims data are available, one can plot the damage ratio vs. the intensity of the ground motion parameter of choice at each claim location using data from the ground motion maps published by the USGS for the causative event (in this case, the 1994 Northridge earthquake).

A scatter plot of the damage ratio versus the intensity parameter (in this example spectral acceleration at a period of 0.3s, which is relevant for wood frame houses) is shown in Figure 75 for wood frame houses constructed between 1976 and 1994.

The overall trend in the data is obscured by the large variability in the dataset. However, the trend can be easily uncovered by simply plotting the mean damage ratio of the data points grouped in spectral acceleration bins, as shown in Figure 76. The blue dots in the figure indicate the average damage ratios calculated from the claims data shown in the pink dots in Figure 75, for a set of spectral accelerations bins. The red squares in Figure 76, which are extracted from the larger dataset from the DOI, are in excellent agreement with those of the smaller dataset.

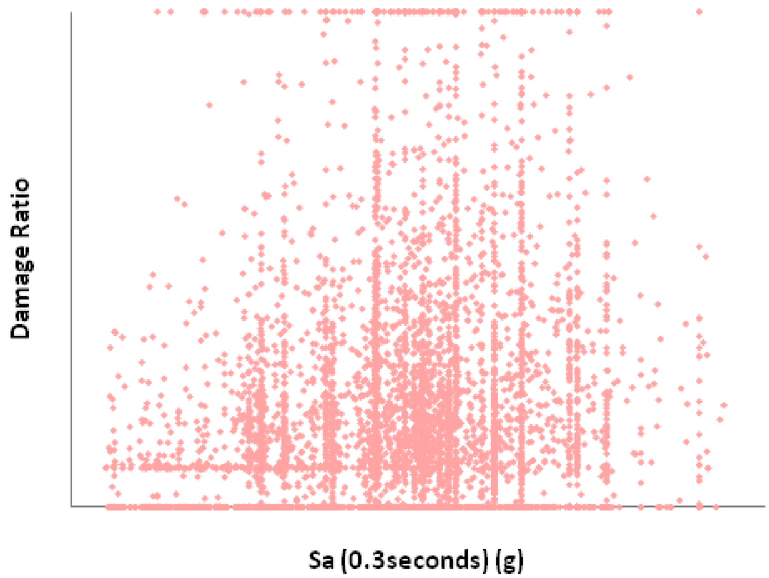

Figure 75. Damage Data from the 1994 Northridge Earthquake for Wood Frame Houses Built after 1976

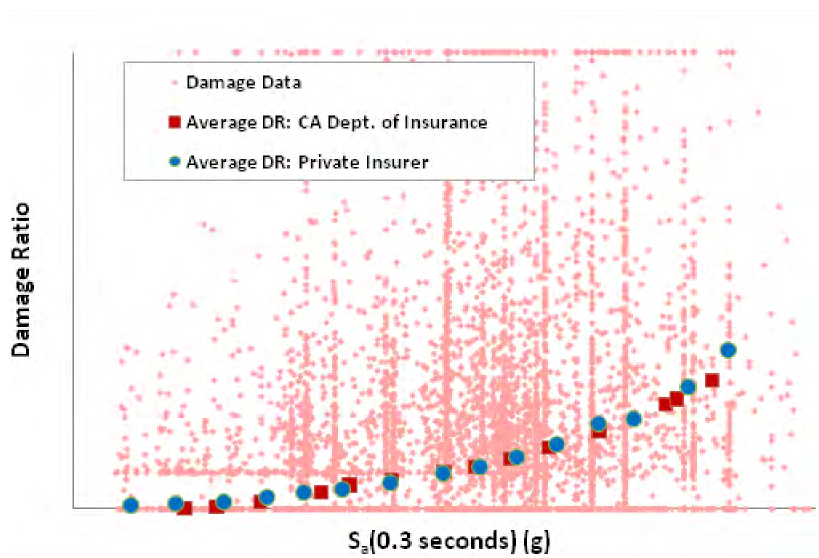

Figure 76. Average Damage Ratios for a Set of Spectral Accelerations

Note, however, that the claims data shown in the previous two figures do not convey any information about losses below deductibles that are suffered by many properties. In statistical jargon, claims data can be categorized as *censored* data. The issue of censored data is carefully accounted for in the empirical derivation of the damage functions to avoid a positive bias in the damage ratio estimates. The description of the censored data analysis is omitted here for brevity.

The empirical information, such as that shown in the previous figures, can then be considered along with results from engineering analyses. Figure 77 shows analysis results for wood frame houses of similar vintage. In the figure, each green dot represents the result of non-linear dynamic analysis on a ground motion record. The green dots near the top of the chart represent analyses that caused the structure to collapse. The damping ratio (ζ) is 5% of critical damping.

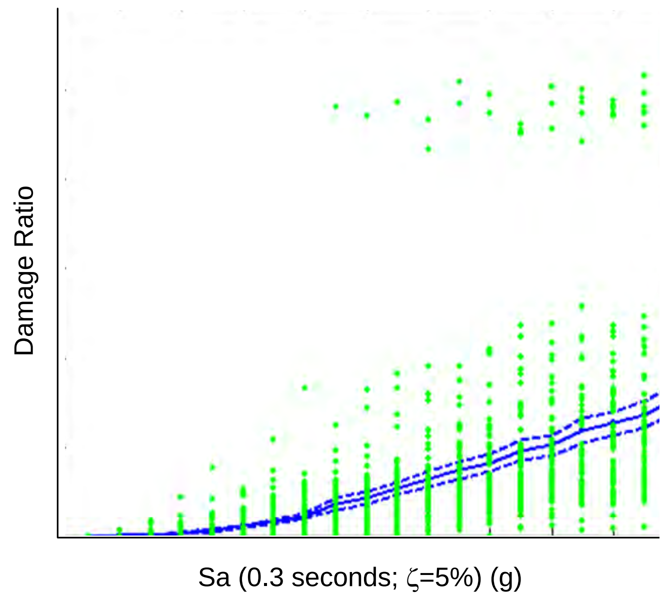

Figure 77. Damage Ratios vs. 0.3 s Spectral Acceleration for Wood Frame Houses Built around 1980

Despite the availability of empirical data, engineering analyses are still vital since the quality of the empirical data is not accurate enough to differentiate houses with different characteristics (e.g., foundation type or number of stories). The effects on damage ratios caused by these differences can easily be modeled using engineering analyses. In synthesis, the combination of empirical claims data and engineering analyses is the best tool to generate credible and realistic damage functions.

Extensive databases of claims data, such as those shown for wood frame structures, are unfortunately not available for other construction classes. There are, however, detailed databases of historical damage data, rather than claims data, for several construction classes other than wood frame. In place of the loss from a claim, the damage data provides detailed descriptions of the damage caused to an asset at a given location. Of course, the damage data can be used to estimate the repair cost and, after normalization by the replacement cost of the building, the damage ratio. Datasets of damage data are available for a variety of construction types, including:

- Concrete tilt-up buildings
- Unreinforced masonry buildings
- Steel moment-resisting frame buildings
- Concrete moment-resisting frame buildings

For illustrative purposes, the following section provides some details on the damage data available for tilt-up and unreinforced masonry buildings. The damage data from the 1994 Northridge earthquake, available for moment-resisting steel frame and reinforced concrete (RC) buildings, is more limited and therefore it was used only to validate the results of the engineering analyses.

Figure 78 shows the location of about 100 tilt-up buildings that were damaged during the Northridge earthquake, along with a brief synopsis of the types of damage that were incurred. Figure 79 shows the corresponding post-occupancy tag that inspectors assigned to each building. The tags also give an indication of the downtime of such buildings.

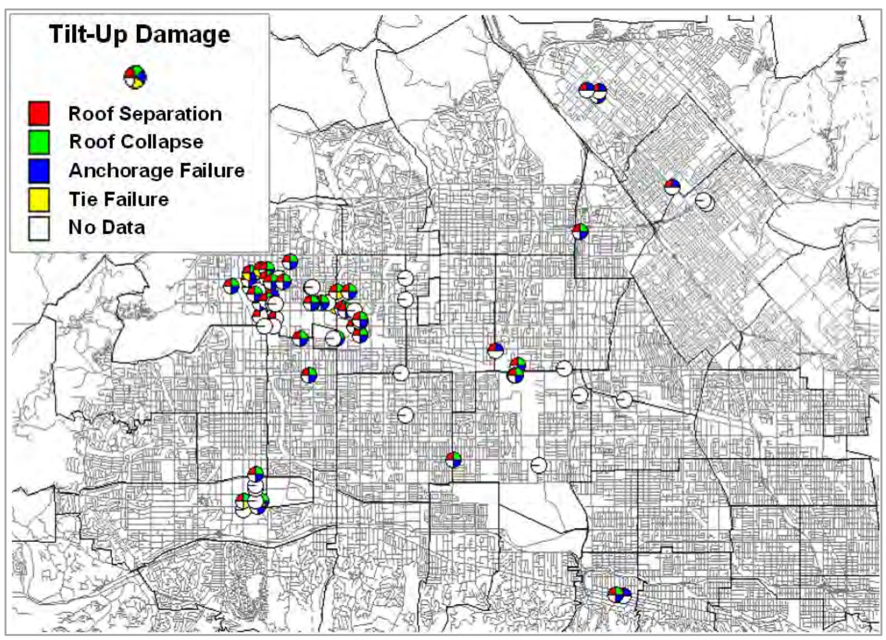

Figure 78. Damage to Approximately 100 Concrete Tilt-Up Structures after the 1994 Northridge Earthquake

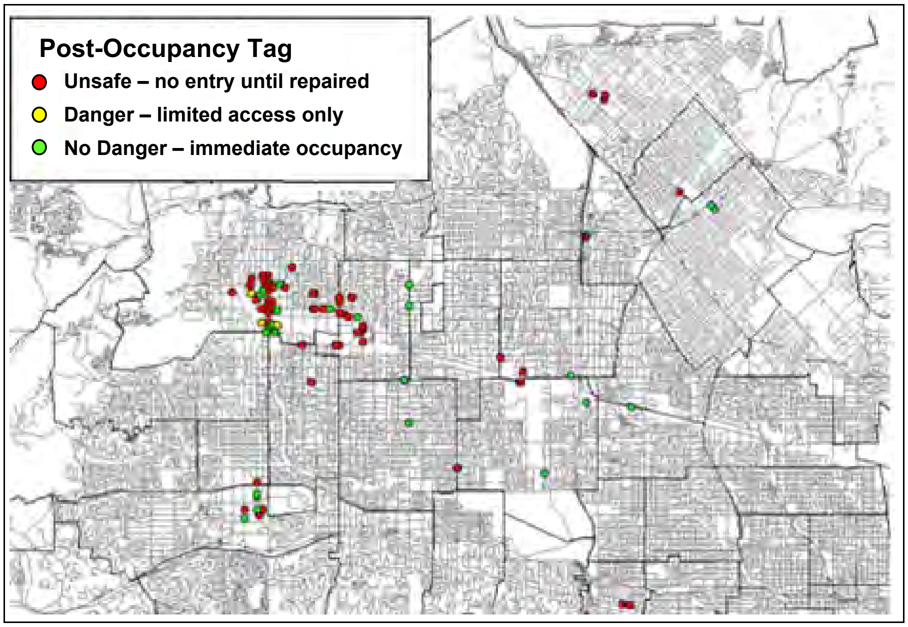

Figure 79. Post-Occupancy Tags Corresponding to the Damaged Tilt-Up Structures after the 1994 Northridge Earthquake

For unreinforced masonry (URM) buildings, damage data from several historical earthquakes is available. Most of the data used for developing the AIR damage functions were collected by the Office of Emergency Services (OES) in California, after the 1989 Loma Prieta and the 1994 Northridge earthquakes. The data covers 850 buildings damaged by the Loma Prieta earthquake, shown in Figure 80, and 3500 buildings damaged by the Northridge earthquake, shown in Figure 81.

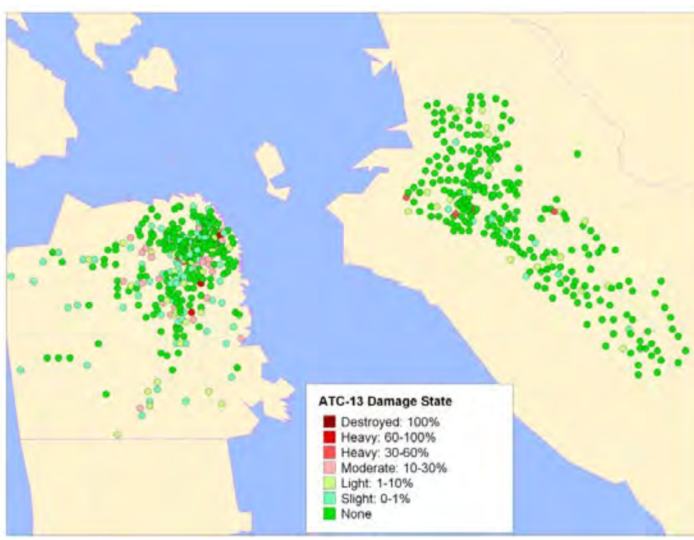

Figure 80. Damage Distribution for URM Buildings, 1989 Loma Prieta Earthquake

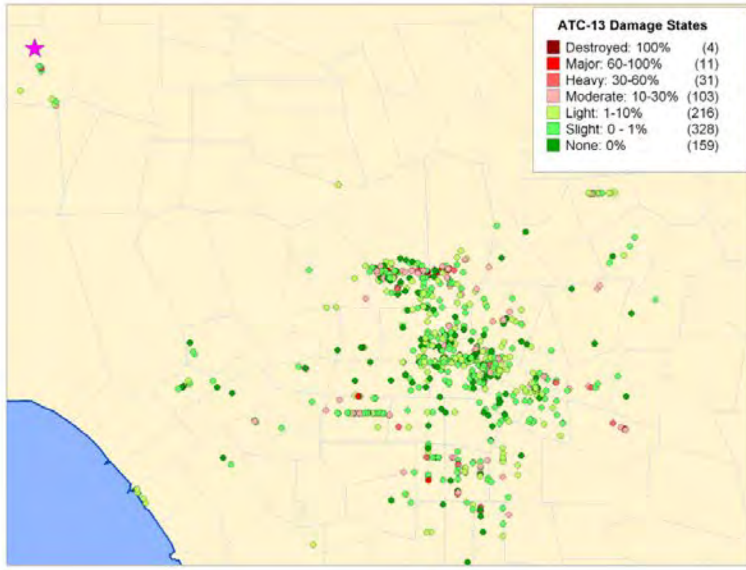

Figure 81. Damage Distribution for URM Buildings, 1994 Northridge Earthquake

Figure 82 shows the scatter plot of the damage ratio inferred for these damaged URM buildings versus the spectral acceleration that was likely observed at the buildings' site during those earthquakes.

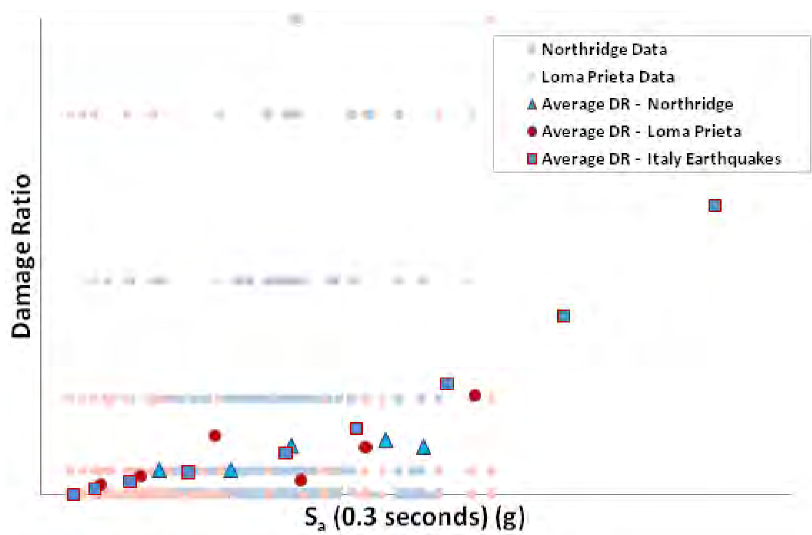

Figure 82. Damage Ratios for URM Buildings for Earthquakes in California and Italy

The figure also shows the average of the damage ratio for different spectral acceleration bins. For comparison purposes, blue squares indicate the average of the damage ratio from a very large set of URM damage data collected by the Italian Department of Civil Protection covering earthquakes that have occurred in

Italy since 1975. Interestingly, the similarity of the trends between the data from the U.S. and Italy is striking—despite inter-country differences in URM building practices.

Figure 83 shows the final damage functions for California for selected construction types.

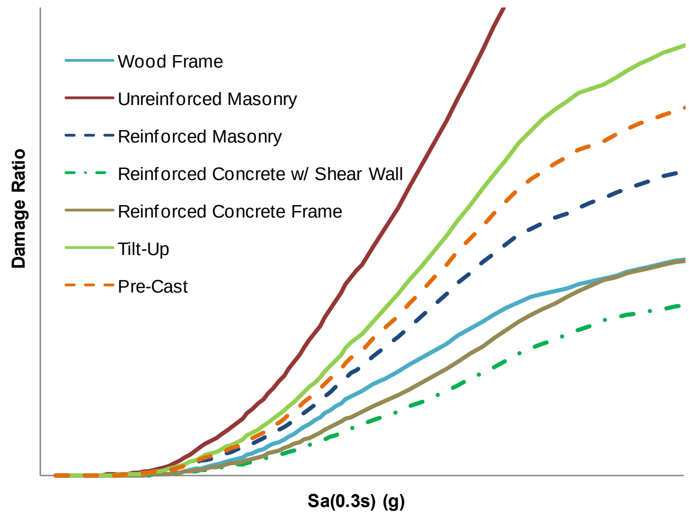

Figure 83. Damage Functions for Various Construction Types in California

The preceding discussions have described the development of damage functions for construction classes in California. The damage functions for buildings in other regions of the U.S. were developed by modifying the damage functions for corresponding buildings in California, accounting for the different design loads and construction practices. Adequate consideration has also been given to specific studies on for the damageability of buildings in the central and eastern United States performed by the Mid-America Earthquake (MAE) Center (e.g., Ellingwood et al., 2007 and 2008) and to relevant information in HAZUS.[12] The resulting damage functions for low-rise RC frame buildings in the three seismicity regions considered are displayed in Figure 84.

[12] A GIS-based natural-hazard loss-estimation software package developed by the U.S. Federal Emergency Management Agency (FEMA).

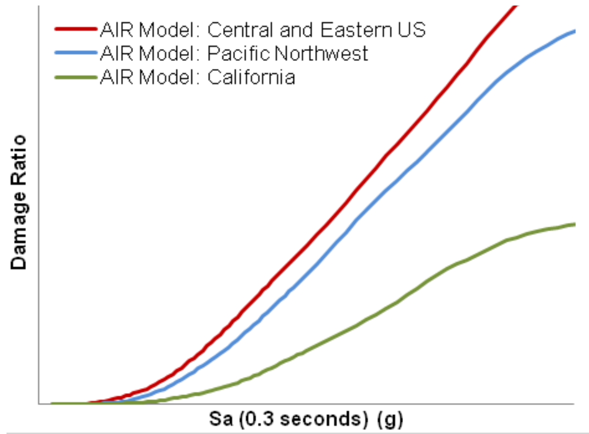

Figure 84. Damage Functions for Low-Rise RC Frame Buildings

The Distribution of Damage: Uncertainty in Damage Estimation

The model's damage functions provide estimates of the mean, or expected, damage ratio corresponding to median ground motion at each affected site. However, as is commonly seen in the course of damage surveys in the aftermath of earthquakes, similar structures at the same location experience different levels of damage. This variation in building damage can arise due to the inherent randomness in building response or to differences in building characteristics, construction materials or workmanship. AIR has developed a distribution around the mean damage ratio to capture this uncertainty in damage, as illustrated in the sample damage function shown in Figure 85.

Observations have shown that, after an earthquake, similar buildings within close range of one another sustain a wide range of damage. Many will be severely damaged or completely destroyed while others in the same vicinity sustain only very light damage or none at all. These damage patterns are commonly represented by a beta distribution, which accounts for this variation in damage.

However, after an extensive study of claims data, AIR engineers have found that a combination of two beta distributions (referred to here as a bi-beta distribution) provides a much better fit to the observed damage patterns in past earthquakes. Therefore, the AIR model has adopted the bi-beta distribution, which shows a much higher level of accuracy when used for insured loss estimations.

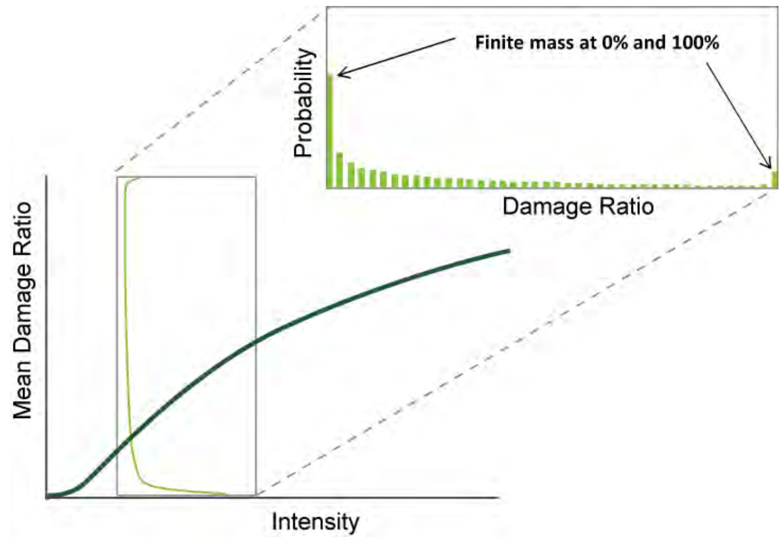

Figure 85. Sample Damage Function and Distribution with Non-zero Probabilities of 0% and 100% Loss

5.8 Damage Functions that Include Ground Motion Uncertainty

The development of mean damage functions discussed in the previous sections are based on fixed levels of ground motion intensities. However, there is a significant amount of variability in the estimation of ground motion intensity at any site for any given earthquake. A damage function that has modified the mean values by taking into account the uncertainty of the ground motion is referred to here as an "integrated" damage function.

Mean damage functions are most appropriate when there is little uncertainty in the estimation of ground motion intensity. For example, they can be used to accurately assess losses suffered during an historical earthquake by buildings that are located close to recording stations, since the uncertainty at those sites is in this case fairly limited. In all other cases, a more realistic loss assessment is achieved when ground motion uncertainty is considered. Integrated damage functions are used in the AIR model to estimate the mean damage for events in the stochastic catalog, as well as for older historical events that have little or no instrumentally recorded data.

Figure 86 shows the mean and integrated damage functions for wood frame structures in California and for the typical variability of the ground motion intensity at a given value of S_a (0.3 s).

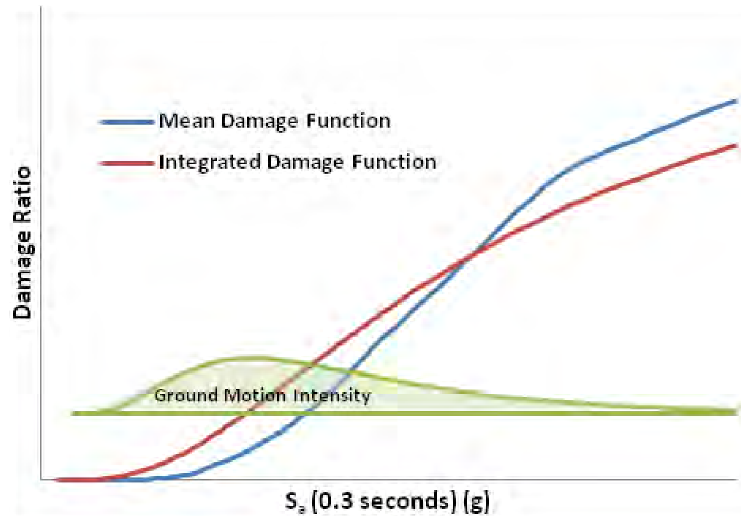

Figure 86. Mean and Integrated Damage Functions for Wood Frame Structures in California

Derivation of the Integrated Damage Functions from the Mean Damage Functions

The mean damage function (the solid blue line in Figure 86) gives the mean damage ratio DR(i) at each level of intensity, *Sa(i)*. The value *Sa(i)* is, however, the mean value of a *distribution* of possible ground-motion intensities (as shown by the green line) that can be generated at a site by an event of given magnitude. Each level of ground motion in that distribution, if it were to occur, would generate a damage ratio that is generally different from DR(i).

The value of the integrated damage function at Sa(i) is simply the weighted average of all the damage ratios generated by all possible ground motion levels in the green distribution. The weights are equal to the likelihood of the occurrence of each ground motion level as calculated from the green distribution. By taking the variability of ground motion into account, the integrated damage function is less steep than the original damage function, as can be seen in the figure.

Using ShakeMap for Damage Function Calibration

The AIR method for simulating ground motion discussed throughout Section 4 is especially useful when modeling historical earthquakes for which there are few or no reliable recordings. Also, the AIR method provides a realistic distribution of losses by using the integrated damage functions that account for spatial correlation of ground motion residuals, as discussed above.

However, in some cases USGS ShakeMap is particularly useful for calibrating the models damage functions. These are shaking and intensity maps based on a variety of data from historical earthquakes including ground motion recordings, geological conditions, and earthquake location and magnitude. It produces the best set of ground motions within a fine grid cell, so the damage functions calibrated to these maps for historical events take into consideration a range of ground motion levels at sites throughout the region, depending on the distance from the earthquake and different geological conditions at each site.

Calibrating damage functions to information-rich ShakeMaps produces realistic losses for a wide range of portfolios. The accuracy of the ShakeMaps can be illustrated by comparing them to actual recorded ground motion intensities for two well-known and well-recorded historical earthquakes: the 1994 Northridge and the 1989 Loma Prieta events. Comparisons are shown using both PGA and spectral acceleration values.

Figure 87 compares modeled and observed ground motion intensities for the 1994 Northridge earthquake; measurements are in terms of peak ground acceleration (PGA).

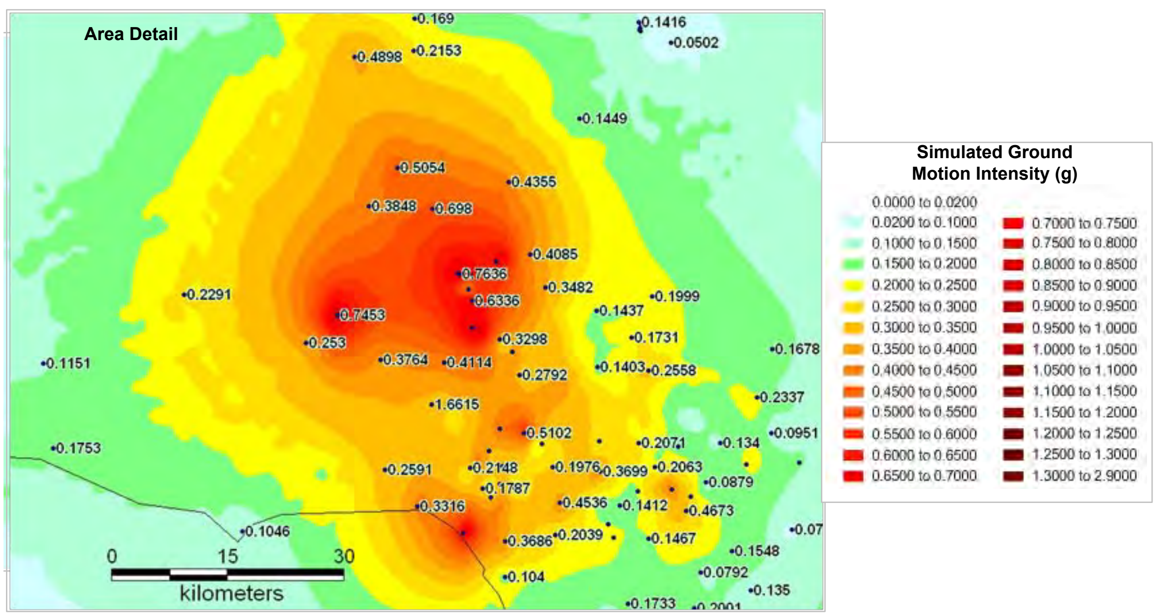

Figure 87. Simulated ShakeMap (colors) vs. Observed (numbers) PGA, 1994 Northridge Earthquake

Figure 88 and Figure 89 compare the ShakeMap ground motion against observed spectral accelerations at periods of 0.3 second and 1.0 second, respectively. At periods between 0.2 and 0.3 second, the intensity is generally higher and typically provides the maximum amount of shake damage. Therefore the intensities for 0.3 second are higher than those for 1.0 second or the PGA.

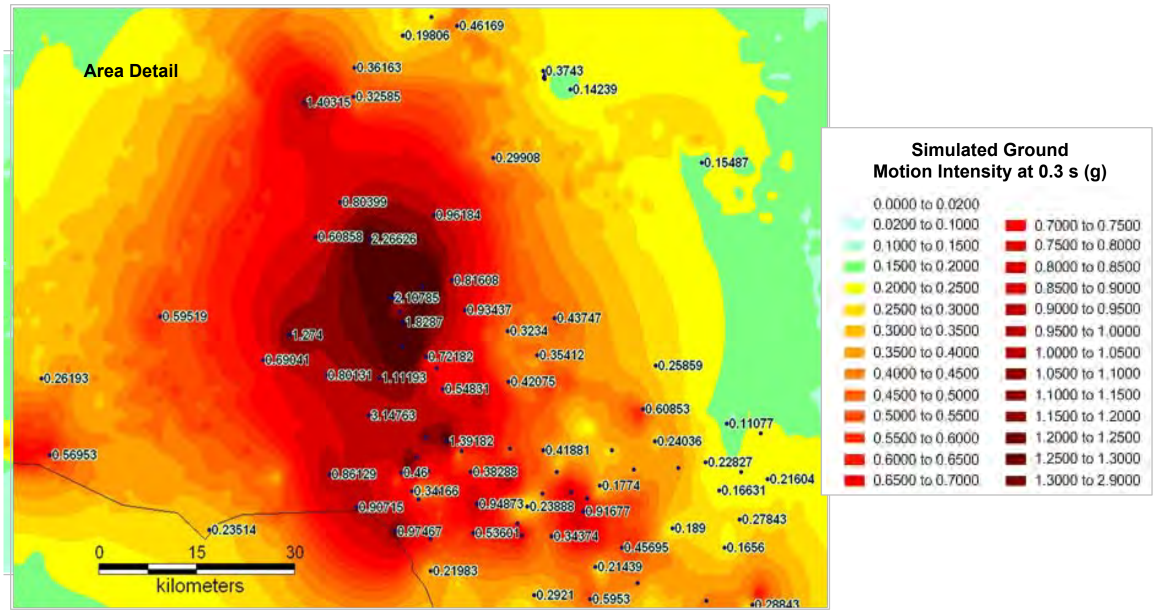

Figure 88. Modeled vs. Observed Sa at 0.3 second (g), 1994 Northridge Earthquake

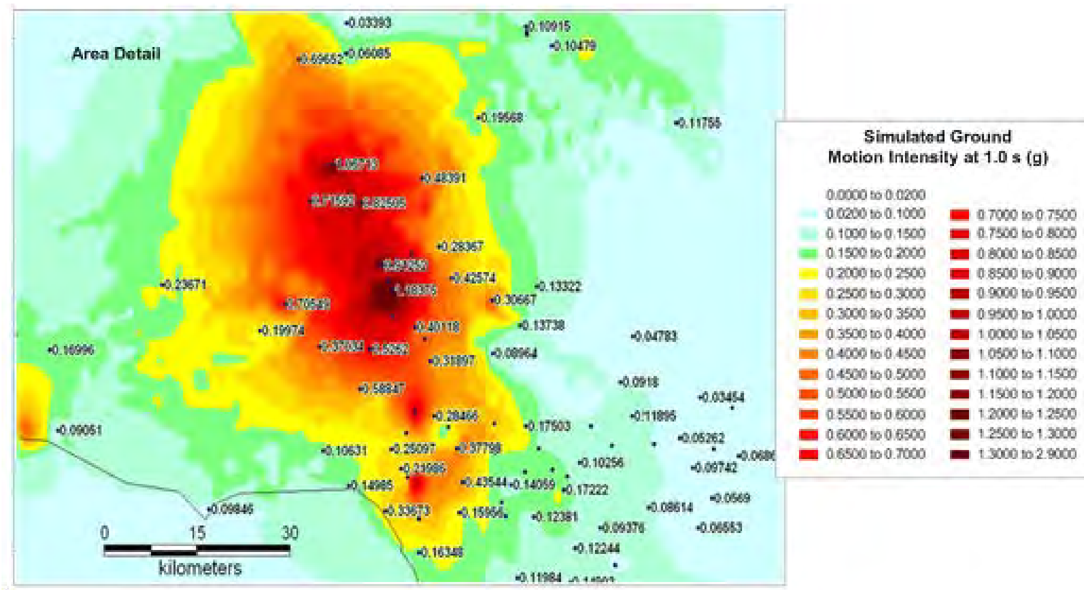

Figure 89. Modeled vs. Observed Sa at 1.0 second (g), 1994 Northridge Earthquake

Figure 90 compares modeled and observed ground motion for the 1989 earthquake at Loma Prieta; measurements are in terms of peak ground acceleration (PGA).

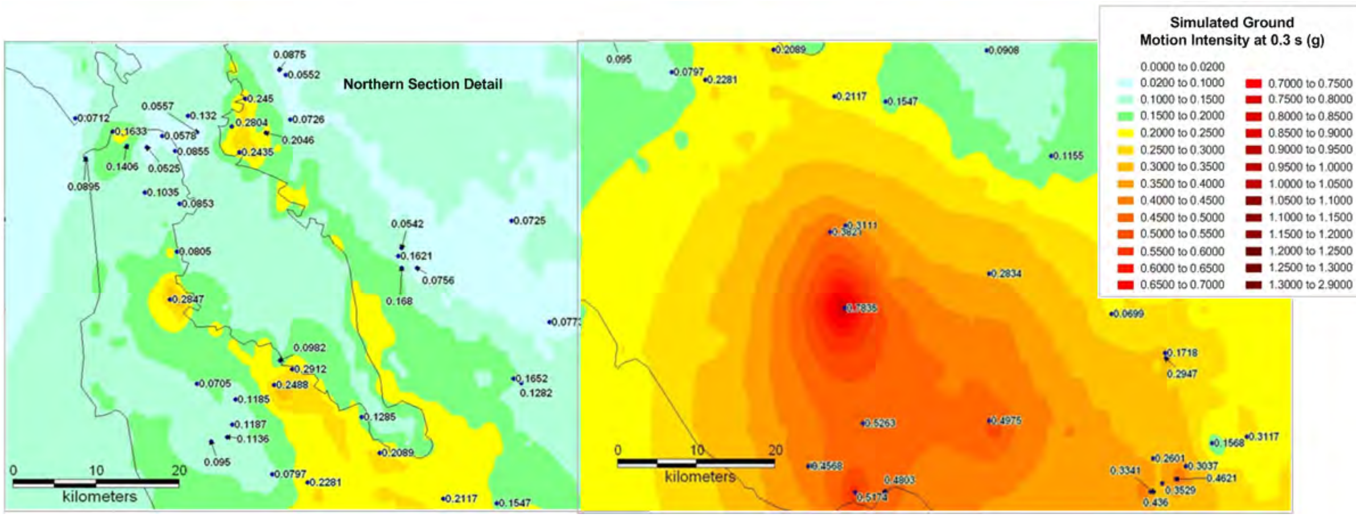

Figure 90. Modeled vs. Observed PGA, 1989 Loma Prieta Earthquake

Figure 91 and Figure 92 compare the simulated ground motion against observed spectral accelerations at periods of 0.3 second and 1.0 second, respectively. Again, at periods between 0.2 and 0.3 second, the intensity is generally higher and typically provides the maximum amount of shake damage. Therefore the intensities for 0.3 second are higher than those for 1.0 second or the PGA.

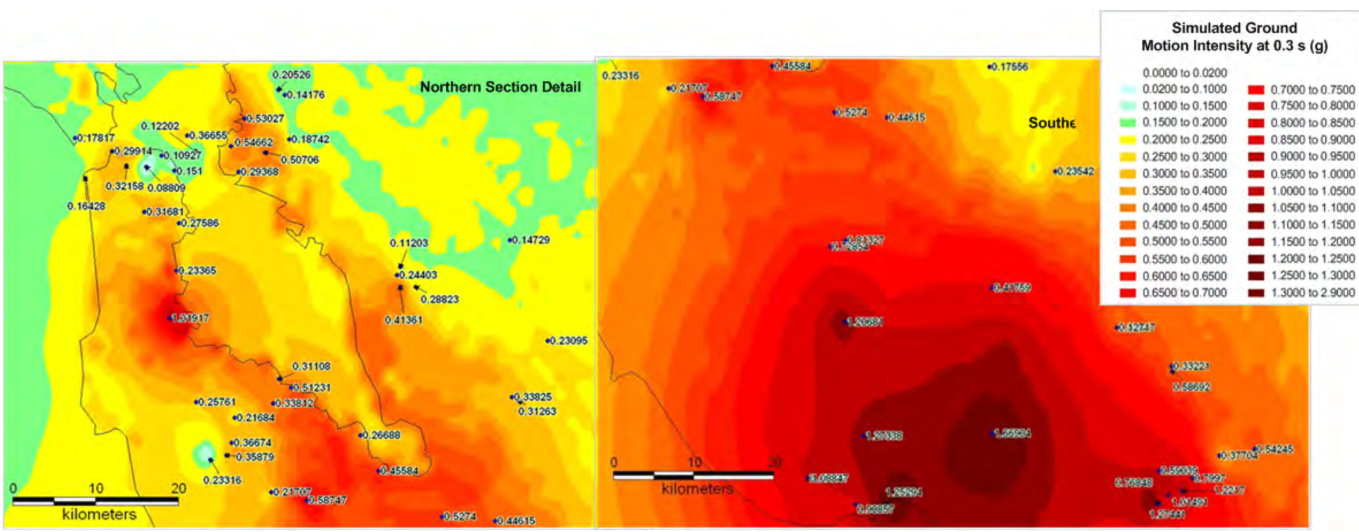

Figure 91. Modeled vs. Observed Sa at 0.3 second (g), 1989 Loma Prieta Earthquake

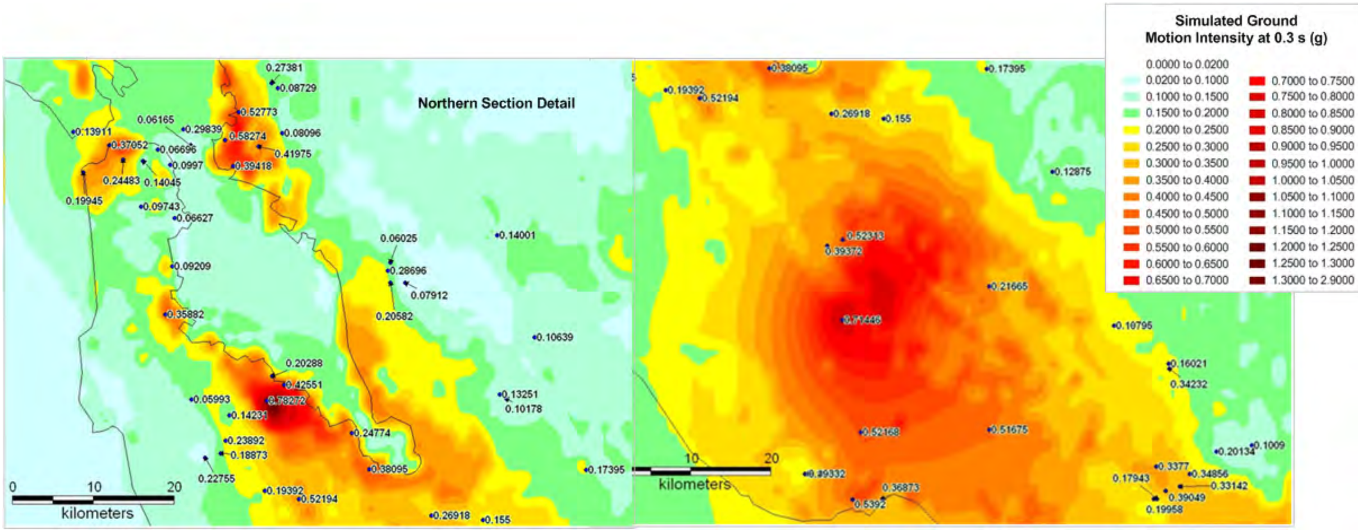

Figure 92. Modeled vs. Observed Sa at 1.0 second (g), 1989 Loma Prieta Earthquake

5.9 Builders Risk

The builders risk line of business determines potential losses resulting from earthquake damage to buildings while they are still under construction. This line of business can be applied to all supported 100-series construction classes and 300-series occupancy classes, for all height and age bands. Note that contractor equipment is not modeled under builder's risk; it is modeled using existing construction and occupancy classes.

Builders risk is implemented in the AIR Earthquake Model for the United States by applying time-dependent secondary modifiers to loss estimates for a building whose construction is complete. The model provides annualized average project loss estimates for the duration of the construction (defined as the duration of the policy), for each phase of construction, and for the worst case scenario (i.e., when an earthquake occurs at the end of construction, or when the replacement value approaches the replacement value of the completed building). The time-dependency of these modifiers is based on the variability of the building's vulnerability and replacement value from one construction phase to another.

To develop the builders risk damage functions, AIR engineers conducted extensive structural analyses of buildings during the four phases of construction (see Table 12) using data from RS Means 2011 (Reed Business Information), United States Construction 2010 Census, and the National Building Construction Manual for 2009.

Table 12. Building Phases during Construction

Building Phases	
I Foundation and Substructure	III Walls and Roofing
II Superstructure	IV Finishing, Mechanical and Electrical Installation

Duration of Building Phases

The four construction phases in Table 12 overlap one another, with the timeline of each dependent on the type of building. For commercial buildings, for example, phase IV will be much longer than it would be for residential ones. To determine the phase duration, AIR engineers used engineering cost estimation data. Figure 93 shows an example of the phase timeline for a mid-rise (4-7 stories) commercial building. The duration for each phase is presented as a percentage of the total time to complete a building.

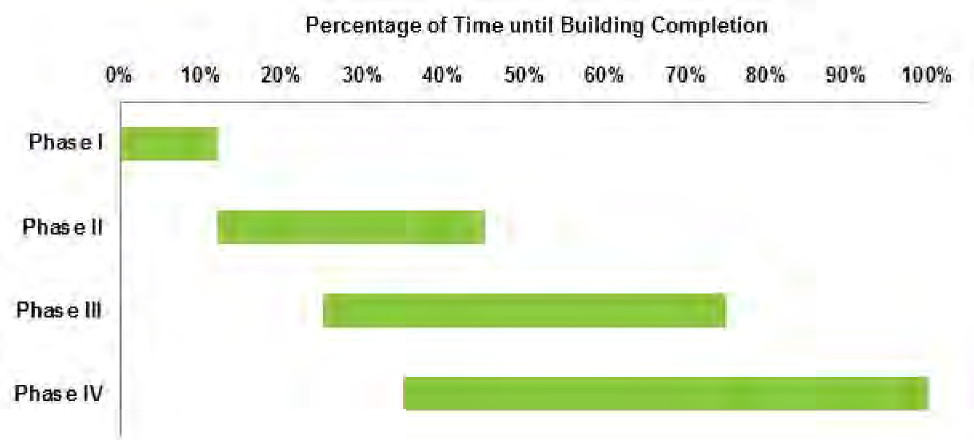

Figure 93. Duration of Phases for a Mid-Rise Commercial Building

AIR engineers also took into consideration the subcomponents at each phase. For example, to determine the vulnerability curves for phase III, the vulnerability of the roofing, windows, and exterior walls were all considered. Figure 94 illustrates the duration of some of the subphases for a mid-rise commercial building. The figure includes the duration and overlap of the main four phases, illustrating how the many subphases are included in more than one main phase.

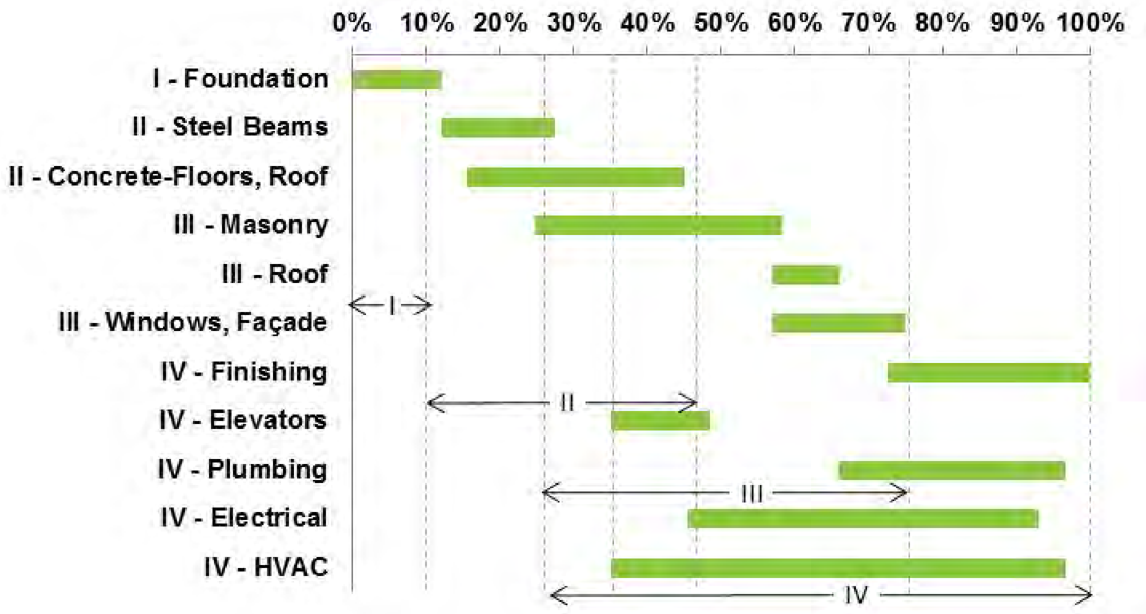

Figure 94. Duration of some Sub-Phases for a Mid-Rise Commercial Building

Variations in the Replacement Value during Construction

The relationship between the building cost, or replacement value, and project duration is captured in a cost ramp-up curve, which shows the evolution of a total project cost over time. At each construction phase, the percentage of the ultimate replacement cost of the building depends largely on the building's height and occupancy class.[13] (Construction class does not have a significant effect on the variations in the percentage.)

The effects of height on building costs can be illustrated by examining the percentages of the total cost at each construction phase for buildings of the same occupancy type but different heights, as shown in Table 13, which uses the example of apartment buildings. For each height band, the cost of each phase is presented as a percentage of the total cost; therefore, a change in the costs at particular phase causes the costs of other phases to be adjusted.

For low-rise buildings, the foundation and substructure account for a larger percentage of the entire building (and its cost) than they would for a mid-rise building. This is because the absolute cost of phase II in mid-rise buildings has a higher increase over phase I than it does for low-rise buildings, making the percentage of the phase I cost lower. The cost percentage for high-rise buildings is

[13] Only a subset of the model occupancies is supported in builders risk. The main occupancies modeled with unique phase durations are residential and commercial buildings; they do not include industrial facilities.

greater since these buildings require a more elaborate foundation than shorter buildings.

The cost percentages at phase II increase steadily with height, with a larger increase from phase I for taller buildings. This is to be expected since the columns and other elements of the superstructure are more elaborate for taller buildings than for lower ones. It is also the reason for the decrease in the percentage of cost with height at phases III and IV. Due to the large increase in the costs of phase II for mid-rise and high-rise buildings, the percentages of the total cost at phases III and IV are diminished.

Table 13. Percentage of the Total Cost at each Construction Phase for Apartment Buildings of Different Heights

Construction Phase	Low Rise (1-3 Stories)	Mid Rise (4-7 Stories)	High Rise (8+ Stories)
I Foundation and Substructure	6%	5%	7%
II Superstructure	9%	12%	13%
III Walls and Roofing	14%	12%	10%
IV Finishing, Mechanical and Electrical Installation	71%	71%	70%
All Phases	**100%**	**100%**	**100%**

The cost ramp-up curve in Figure 95 shows the changes in the replacement value for commercial buildings of different heights. The sharp bend in the curves indicate the beginning of phase IV when the interior work occurs, mechanical and electrical systems are installed, and the finishing touches are applied. (This corresponds to the bend in the replacement value curve shown in Figure 99.) The replacement value then levels off slightly once the finishing touches begin since the costliest parts of this phase are complete at that time.

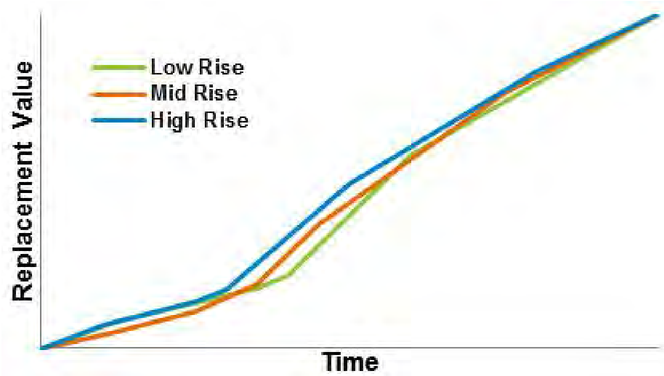

Figure 95. Changes in Replacement Value during Construction of a Commercial Building, for Different Heights

Figure 96 compares the cost ramp-up curves for low-rise buildings of different occupancy classes. After phase IV, the curve ramps up more sharply for apartment buildings. Apartment buildings have a larger amount of interior work and finishing, which have to be done in each unit. In addition, the materials used for residential kitchens and bathrooms are generally of a higher quality than in commercial and industrial buildings. While commercial and industrial buildings have more wall partitions, facilities, and fixtures, the materials are not as costly as those in apartment buildings.

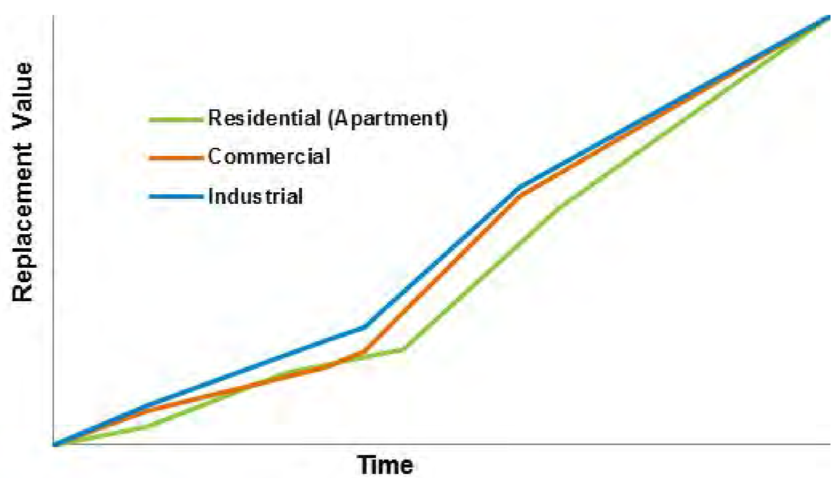

Figure 96. Changes in Replacement Value during Construction of Low-Rise Buildings with Different Occupancy Classes

The various occupancy types within each class can have a significant effect on the variations in replacement value during construction, as shown in Figure 97. For example, phase IV of a hospital can take up a larger percentage of the total cost than of other buildings, due to the extensive electrical and mechanical fittings that are required for a hospital. For other large structures, such as a wholesale trade centers, costs are more concentrated in phases II and III due to the extensive walls, roofing, and other elements of the superstructure. Phase IV is less important in these cases since the interior walls and fixtures are not as costly as in other buildings.

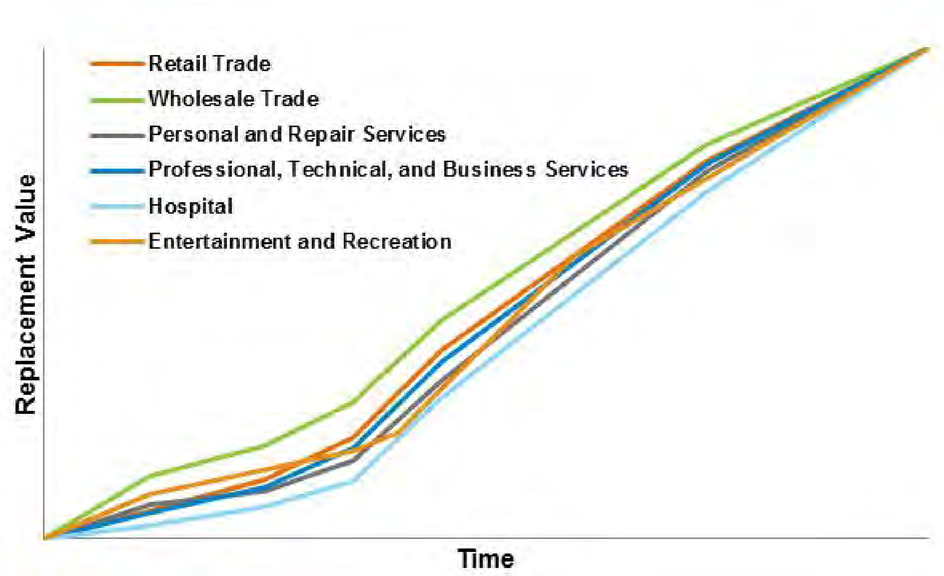

Figure 97. Changes in Replacement Value during Construction of Mid-Rise Commercial Buildings with Different Occupancy Types

Variations in Vulnerability during Construction

As construction progresses, the changes in vulnerability must be considered along with the replacement value. The seismic effects on the building are different during each building phase.

I. Foundation and Substructure. The vulnerability is lowest at this phase.

II. Superstructure (Frame and Decks). The vulnerability is highest at this phase. Specifically, it increases rapidly during this phase, eventually exceeding the vulnerability of the completed building; its shorter natural period results in a higher seismic demand. The lateral load-resisting systems also may not be complete at this phase (e.g., connections may be loose and bracing may be incomplete). As this phase progresses the vulnerability eventually decreases until it is close to that of the completed building.

III. Exterior Walls, Doors, Windows, Roofing. At this phase the vulnerability is close to that of the completed buildings.

IV. Finishing, Mechanical and Electrical Installation. The seismic response remains unaffected during this stage; vulnerability is that of the completed building.

These changes in seismic vulnerability are illustrated in Figure 98, which clearly shows the low vulnerability for phase I as well as the similarity in vulnerability changes for the other phases.

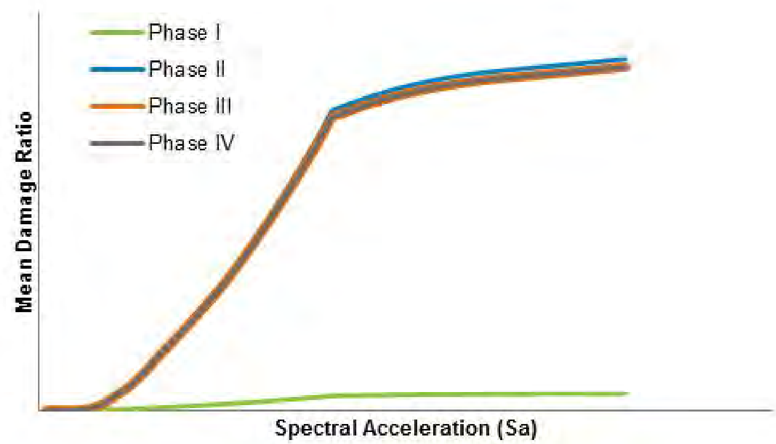

Figure 98. Changes in Seismic Vulnerability at Each Construction Phase

Figure 99 shows how the replacement value and vulnerability vary during construction, with the vulnerability at any given time corresponding to a specific replacement value at that time.

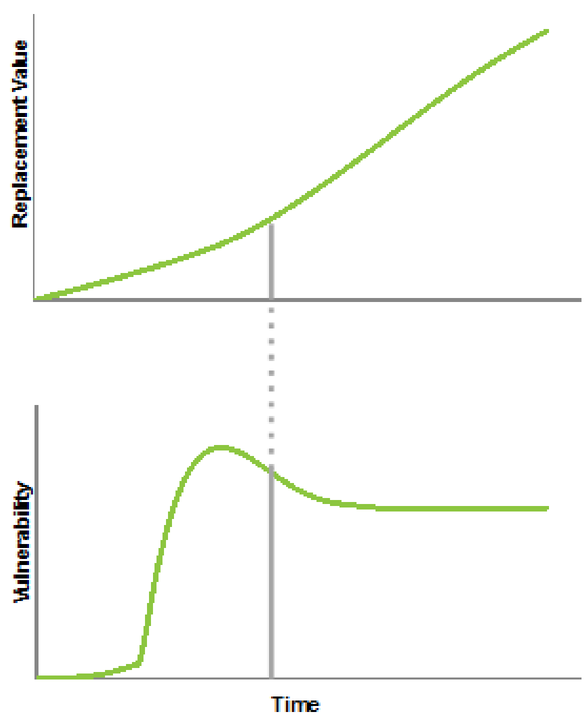

Figure 99. Variations of Replacement Cost and Vulnerability of Buildings under Construction

5.10 Contents Damage

In the AIR Earthquake Model for the United States, contents damage is a function of spectral acceleration (see Section 4) and also of the occupancy class. (Each occupancy class is associated with a set of typical contents and their vulnerability to shake damage.) Contents damage is generally higher in commercial occupancies than residential ones, and higher in industrial facilities than in commercial facilities.

At low levels of shaking, the primary determinant of contents damage is floor acceleration, which imposes inertial lateral forces. At higher levels of shaking, contents damage depends on both inertial forces and building damage. For example, contents may be damaged due to the collapse of both structural and nonstructural components, including ceilings, beams, and columns. Content damage generally increases at higher levels of shaking. Unreinforced masonry structures have the highest content damage of the construction classes.

5.11 Additional Living Expenses

Damage functions are also included for time element, or additional living expenses, for residential structures. The AIR ALE damage functions take into account the time that people may need to stay in a hotel or elsewhere while their home is repaired. It also takes into consideration any necessary time taken off work due to the inability to get to their place of employment, or necessary time spent with contractors.

ALE loss is a function of the mean building damage, which in turn is used to estimate the number of days required to repair or rebuild the structure, and an estimate of per diem ALE costs. The damage functions were calibrated to and validated by actual claims data, primarily from the Northridge earthquake.

5.12 Business Interruption

Downtime, or the number of days before a business can return to full operation, is the primary parameter for estimating business interruption (BI) losses. The methodology used for estimating BI losses, as illustrated schematically in Figure 100, utilizes an event tree approach, incorporating the latest research and findings from an extensive analysis of claims data. For each damage state, a probability is assigned to two possible outcomes: continued operations or cessation of operations at the location. If operations cannot continue at the location, a probability is assigned to whether the company will relocate. These probabilities vary by occupancy. For example, while relocation is feasible for an office, it is not for a hotel. Thus the two will take different paths to recovery, and hence will have different downtimes in the event of business interruption.

Downtime is calculated for each stage of the damage assessment and recovery process. The first stage is the time before repairs can get underway (pre-repair). Damage must be assessed, repair costs negotiated with contractors, and the building permit obtained. The next stage is the repair time. Some businesses choose to relocate rather than wait for repairs, but relocation takes time as well. Once repairs are completed, revenues may not resume immediately at the pre-disaster level; it may take some time to regain market share, or to rebuild a labor force that may have been dislocated.

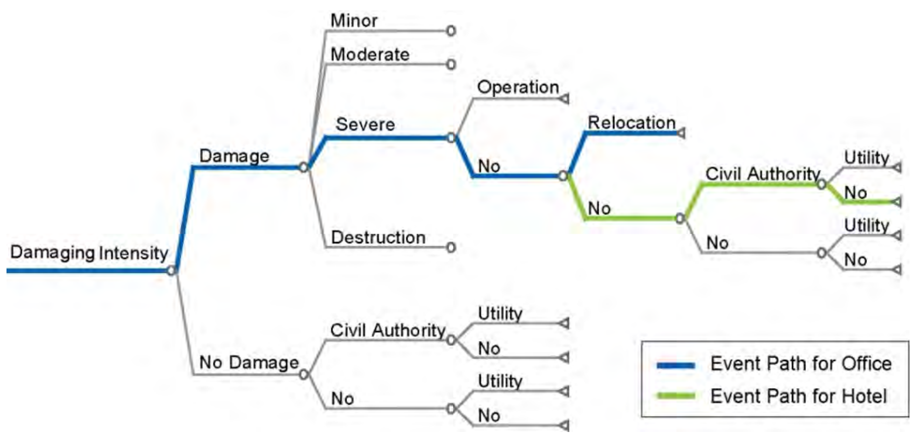

Figure 100. Hypothetical Event Tree of BI Estimation for an Office and a Hotel

In the AIR model, the estimated number of days needed to restore the business to full operation depends on a number of key factors, including the level of damage sustained, the size of the building (as approximated by building height) and its architectural complexity (as approximated by occupancy class).

For a given damage ratio, a 2,500 square meter hotel will take significantly longer to repair than a 450 square meter professional office. Since floor area is usually not directly available, it is estimated using building height. For a given floor area, buildings with significant architectural complexity will also take more time to repair. Warehouses can be quite large, but repairs are likely to take place quickly because of their architectural simplicity. Interior finishes must also be taken into account. Hotels are not only typically larger than offices, but can take more time to repair due to the higher quality of interior finishing.

Some types of businesses, such as hospitals, are more resilient than others and may be able to restart operations before repairs are complete, or they may have had disaster management plans in place that allow them to relocate some operations quickly. For other businesses, such as hotels, location is all-important and relocation is not an option. Since many parameters (such as building size, complexity, and business resiliency) critical to determining business interruption are generally not available for input into the model, occupancy class is used as a proxy to measure these parameters.

Occupancy is also used to estimate the probability that there may be business interruption at a dependent building within the damage footprint—such as the supplier of a necessary manufacturing input—that will exacerbate BI losses at the principal building. Estimation of the impact of the dependent building(s) damage on the principal building requires knowledge of the location and the degree of interdependence between dependent and principal buildings. Since this level of detailed information is generally not available, logical assumptions are made to estimate the impact of the dependent building(s) on the principal building's downtime. The methodology for estimating BI losses relies in part on loss experience data and in part on expert judgment in the face of limited available exposure information.

The functional relationship between building damage and loss of use is based upon published construction and restoration data along with expert engineering judgment. Figure 101 shows the relationship between repair time, or downtime, and the mean building damage, for a variety of occupancy classes.

Note that the model includes business interruption damage functions for all occupancy types in CLASIC/2. CATRADER users can run business interruption losses for occupancies that belong to the commercial and industrial classes.

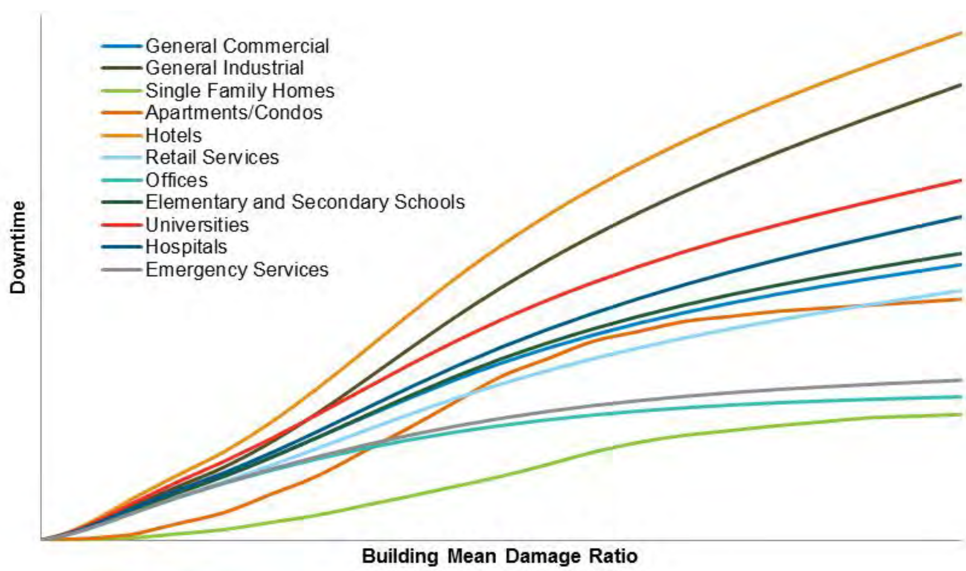

Figure 101. Business Interruption Damage Functions for Different Occupancy Classes

5.13 Automobile Damage

Automobiles damage during an earthquake occurs primarily as a result of debris falling from damaged buildings; therefore, damage to automobiles is modeled as a function of building damage. The damage function in the AIR model is calibrated against the observed damage from the 1994 Northridge earthquake.

5.14 Liquefaction Damage

Areas that are at risk of liquefaction include locations where the soil is saturated with groundwater and becomes liquefied due to violent ground motion. Heavy property damage can result if the soil supports building foundations, or contains buried pipes and lines. Significant damage due to liquefaction was observed in the Marina District of San Francisco during the Loma Prieta earthquake in 1989.

The model assesses liquefaction damage for the seven regions that have sufficient groundwater depth data along with a history of liquefaction during earthquakes. These areas are the greater San Francisco and Los Angeles areas; Portland, Oregon; Seattle, Washington; Salt Lake City, Utah; and the New Madrid and Charleston seismic zones.

In the AIR model, building damage resulting from liquefaction is modeled as a function of peak ground acceleration.

For more information on the causes and effects of liquefaction, liquefaction occurrences during historical earthquakes, and on AIR's assessment of liquefaction damage, see Section 4.

Finally, note that in the AIR Earthquake Model for the United States losses caused by ground shaking and losses caused by liquefaction are combined and are not separable in the software.

5.15 Fire Following Damage

A separate dynamic simulation is used to estimate losses from fires following earthquakes. The components of this damage-estimation module are illustrated in Figure 102.

In the AIR Earthquake Model for the United States, multiple fire simulations are run for each earthquake event. This allows for variations in probabilistically selected simulation parameters for a single earthquake event. For each historical earthquake, 50 simulations are run, and the mean fire damage ratio and loss are calculated for each ZIP Code and fire class. This procedure provides an estimate of the expected fire-following losses were a historical event to recur. In contrast, for each simulated event in the 10,000-year stochastic catalog, ten fire simulations are run in order to produce a wider range of possible fire-following losses while still providing expected values based on a number of potential scenarios for each event.

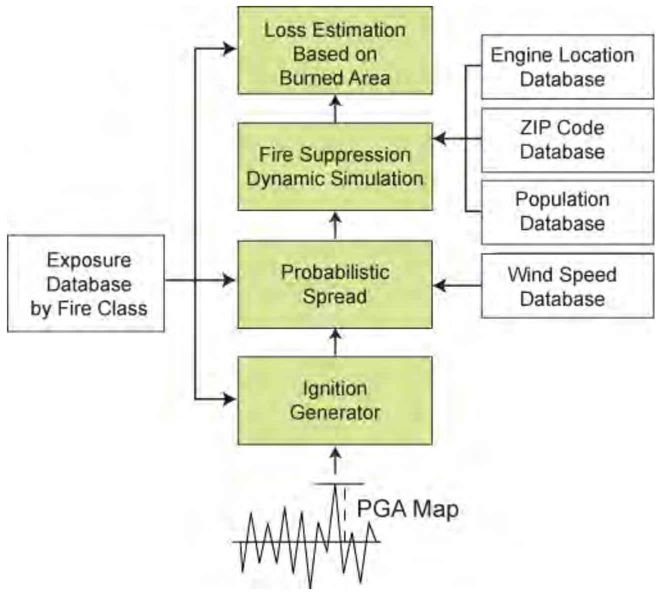

Figure 102. Primary Model Components in Fire Damage Estimation

Databases

A number of databases are used in the fire-following damage estimation module. These include databases of exposure, fire engines, population, and wind speeds. The data collectively affect fire ignition, spread, suppression, and loss estimation.

Exposure: The exposure database, which is used to calculate both shake and fire following damage, is discussed in Section 8. Certain aspects of the exposure data are relevant to the fire–following peril. In particular, exposures for residential and commercial lines of business are each divided into combustible and noncombustible categories. All types of wood construction are considered combustible, while other construction types are considered noncombustible. Each exposure record is assigned to one of five fire classes: residential combustible, residential noncombustible, commercial combustible, commercial noncombustible, and mobile home. The exposure density in a given area is used to categorize the type of urban environment, which determines the building size and spacing parameters used in the model for the exposures in that area.

Fire Engines*:* An extensive fire engine database is incorporated in the model. It includes detailed data for 350 of the largest cities and towns in the contiguous

United States (Figure 103) obtained from local fire departments. For areas not in the database, the model uses a regression technique to estimate the number of fire engines in each area based on the population.

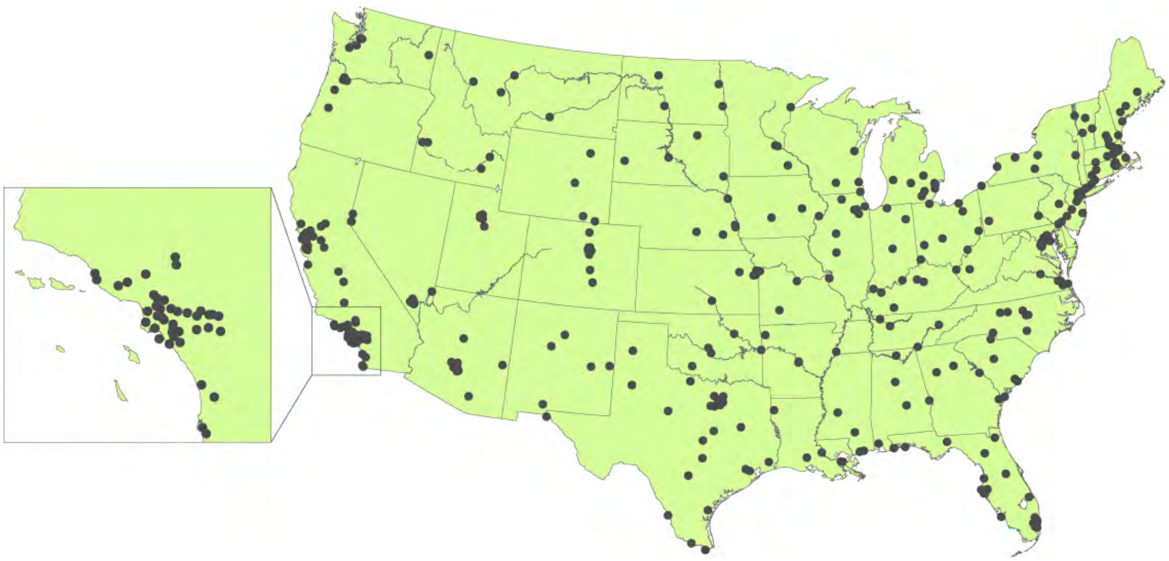

Figure 103. Source Locations for Fire Engine Data – Continental United States and Zoom-in of the Los Angeles Area

Population: Population data for each ZIP Code are used to determine the number of fire engines that are assigned to areas for which actual fire-engine data were not available. These are typically smaller cities and towns. The source of the population data is the U.S. Census Bureau.

Wind Speeds: The model uses a wind speed algorithm to determine the wind speed during a fire outbreak using data collected from the National Weather Service, who provided data from 680 weather stations across the country. The wind speed is selected from a distribution that corresponds to the weighted average of historical wind speed distributions from weather stations surrounding the area affected by the earthquake.

Fire Ignition

The AIR Earthquake Model for the United States features a stochastic fire-ignition algorithm that is based on historical data. During an earthquake, fires may ignite when devices powered by gas or electricity overturn, break, or are struck by another object, generating open flames or chemical reactions, electrical wiring short circuits, or gas lines rupture.

Generally there is a positive correlation between fire-ignition rate and earthquake intensity. Higher levels of ground motion tend to produce higher ignition rates.

Thus, the ignition rate, in ignitions per million square feet of building floor area, is a function of peak ground acceleration (PGA). Figure 104 shows ignition rates for several historical earthquakes.

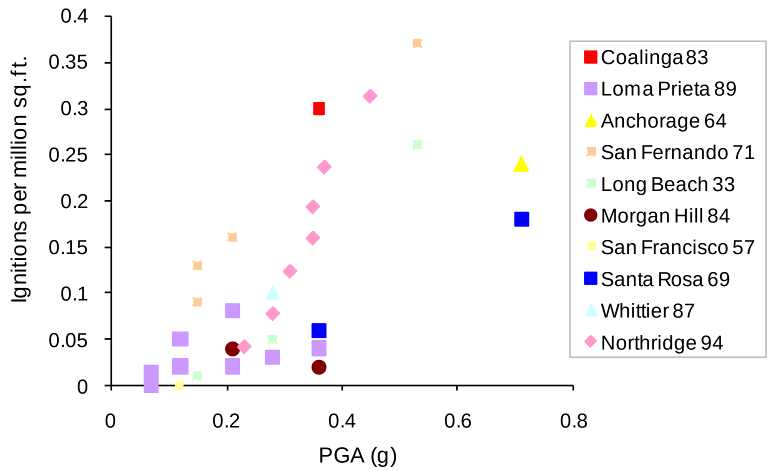

Figure 104. Fire Ignition Data for Selected Historical Earthquakes

Adjustments are made to account for the observation that different fire classes exhibit noticeably different ignition rates. For example, there is a lower probability of fire ignition in a million square feet of commercial high-rise property than there is in a million square feet of single-family residential property for a given level of ground motion. Commercial high-rise buildings typically adhere to more stringent building codes.

For a particular PGA value, the model includes a distribution in ignition rates around the mean, as illustrated in Figure 105. For a given fire class and PGA combination, the model stochastically selects ignition rates from such a distribution to more realistically capture the variability in ignition rates.

After fire ignitions are generated, they are stochastically placed within their ZIP Code.

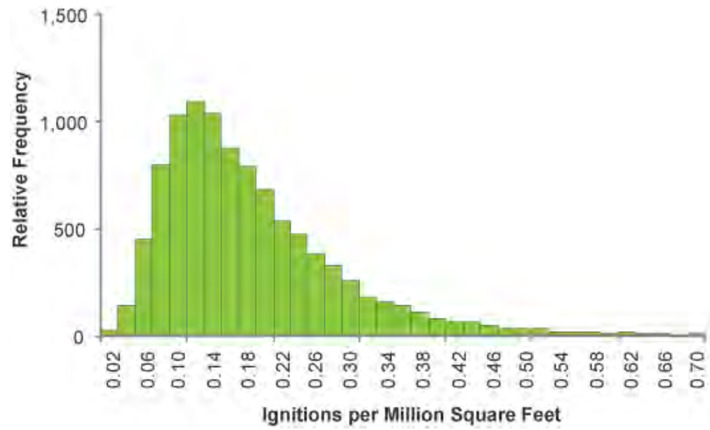

Figure 105. Sample Ignition Rate Distribution at PGA of 0.4 g

Fire Spread and Suppression

The model incorporates distributions in fire-discovery and fire-report times, and fire-engine speeds to determine how much time elapses between each ignition and the beginning of active suppression of the resulting fire.

Fire spread to adjacent buildings is estimated using the Hamada (1975) fire-spread model. Updated Hamada building parameters are based on six different types of urban environments, including very dense urban, dense urban, moderately dense urban, suburban, intermediate suburban-rural, and rural. For each of these urban environments, Hamada building parameters are defined for four different types of buildings: residential single-family houses, mobile homes, commercial, and apartments/condos.

The fire-spread rate in the Hamada model is a function of wind speed. The spread rate is highest in the downwind direction, lowest in the upwind direction, and intermediate in the crosswind direction.

For each fire simulation, a wind speed is drawn from a probability distribution appropriate for the affected area. The probability distribution used corresponds to the weighted average mean historical wind speed for surrounding weather stations. The weighting factor for each weather station is $1/r^2$, where r is the distance from the station to the ignition centroid. The ignition centroid is the mean longitude and latitude of all the simulated ignitions for the fire simulation.

For historical events, the wind-speed distribution is a Rayleigh distribution, which is a Weibull distribution with the shape parameter k equal to two. For stochastic events, the wind-speed distribution is a hybrid Weibull distribution which uses a Rayleigh distribution for the lowest 70% of the wind-speed samples and a Weibull distribution with k equal to one for the highest 30%. While a k value of two is common (Pavia and O'Brien, 1986), using this value alone would not fit the tail adequately. Therefore, the tail of the distribution is modeled as a Weibull distribution with a k value of one.

Fire suppression is modeled for each event using estimates of fire-engine speed, fire-engine capacity, and water availability as a function of the PGA in the area affected by the earthquake. Intense earthquakes are more likely to render roads impassable, break water mains, or result in other situations that affect suppression capability.

Fire spread and fire suppression are modeled as a dynamic process, as both components of the model work together to determine how the fire simulation proceeds and how each individual fire grows and is eventually suppressed. As a fire continues to grow, it requires more fire engines. The additional fire engines are assigned to the fire if they are available. The time it takes to suppress the fire is a function of its size and the number of engines at the site. As fires are suppressed, engines are rerouted to other fires.

The AIR Earthquake Model for the United States takes into account the existence of firebreaks, which are gaps between buildings that are wider than the typical building separation within a city block. Examples are streets and wider boulevards. Fires may be stopped by a firebreak, or they may—with some probability—jump across to the next group of buildings. The crossing probability is a function of the firebreak width and wind speed. Each fire generated in the model has some probability of stopping at each firebreak it encounters, even if there is no active fire suppression.

Fire Damage Estimation

Fire damage is computed for each fire by multiplying the amount of building floor area burned by an estimate of the construction cost per square foot. That cost is then multiplied by a scaling factor to include damage to contents and time element (business interruption) losses. Maximum burn ratios are assigned to each fire class, and total losses for each fire in a ZIP Code are capped by the total exposure.

5.16 Workers Compensation Losses due to Earthquakes

The AIR Earthquake Model for the United States offers an auxiliary damage estimation component that generates losses due to injuries and deaths that occur under workers compensation insurance policies. When ground shaking during an earthquake damages a workplace, employees who are in or near the building at the time can sustain a wide variety of injuries, with severity ranging from minor to fatal. Depending on the time of day the earthquake occurs, the number of people at work at the time, and other factors, a significant percentage of the total insured losses can be due to workers compensation.

The AIR model offers a complex analysis that incorporates the most likely types of injuries that are incurred in buildings of different construction types, with different levels of damage, along with a large number of other factors that affect workers compensation losses. These include the number of injuries and deaths as a function of the injury rates, the nature of the damage sustained by the buildings where the workers are located, and the number of workers who are at risk at the time of the earthquake. The model does not account for any loss of income due to these injuries.

Types of Building Damage that Cause Injury

The primary cause of injury during earthquakes is due to debris falling inside damaged buildings and, in the most severe cases, the collapse of occupied buildings. Therefore, the nature and severity of injuries from earthquakes are modeled as a function of building damage. For each construction type and occupancy class, the AIR model divides the full distribution of building damage into four distinct damage states: minor, moderate, extensive, and complete.

Note that "complete" damage means that a building is not recoverable; it does not necessarily mean that a building has collapsed. However, the state of collapse of a building has significant consequences in a workers compensation loss estimation, since building collapse typically increases the number of fatalities and severe injuries. In the AIR model, the probability of collapse is used to create two categories within the complete damage state: "complete damage without collapse" and "complete damage with collapse."

Building construction, and its effect on a building's ability to withstand ground shaking, has been shown to affect injury and fatality rates significantly. For example, the 1995 Great Hanshin earthquake in Kobe, Japan, which occurred at 5:46 a.m., caused more than 5,000 deaths. In contrast, the 1994 Northridge earthquake, which occurred at 4:30 a.m., resulted in fewer than 60 deaths. The earthquakes were of similar magnitude and both occurred during early morning hours when most people were not yet at work. The difference in fatality counts can be largely explained by differences in building construction. As construction practices vary widely by location, it is inadvisable to use international damage and casualty experience when estimating workers compensation losses in the United States.

However, within the continental United States, the structural requirements for buildings and the degree to which they are enforced vary greatly with location. In earthquake-prone areas, structural requirements are generally more stringent than in areas where there has been little historical earthquake activity. The AIR model takes these requirements into consideration, since they have a significant effect on a building's ability to withstand ground shaking.

Probability of Collapse

The probability of collapse for any given building is determined primarily by its construction class. Masonry buildings, for example, are more likely to collapse than concrete buildings. Steel buildings may experience significant deformation under severe ground shaking, but collapse is less likely.

The collapse probabilities used in the AIR model are adopted from the HAZUS MR4 Technical Manual (FEMA 2009), with adjustments made based on engineering judgment and damage reports from building collapses due to earthquakes in the United States. Table 14 shows examples of the collapse probability used in the AIR model.

Table 14: Collapse Probabilities Used in the AIR Earthquake Model for the United States

Construction Type	Probability of Collapse (%) Given Complete Damage State
Wood Frame, Low-Rise	2
Masonry, Low-Rise	12
Masonry, Mid-Rise	9
Reinforced Concrete, Low-Rise	10
Reinforced Concrete, Mid-Rise	8
Reinforced Concrete, High-Rise	4
Steel, Low-Rise	8
Steel, Mid-Rise	5
Steel, High-Rise	3

Injuries Due to Earthquakes

Historical evidence shows that most of the injuries resulting from small to moderate earthquakes are lacerations, sprains, and contusions caused by non-structural building components falling on people. Life-threatening or fatal injuries are typically caused by the structural damage that occurs with larger magnitude events.

Table 15 shows the percentage of nonfatal injury types for five historical earthquakes of moderate magnitude in California. The data used to construct this table comes from various sources, including studies by Aroni and Durkin (1985). Because these statistics come from multiple studies, the "Other" category contains injuries such as fractures, pain/soreness, respiratory or inhalation injuries, eye injuries, and unspecified injuries, which may not be represented the same way in each study.

Table 15: Distribution of Nonfatal Injuries for Five California Earthquakes

Earthquake		Lacerations	Sprains	Contusions	Cardiovascular	Neurological/ Psychological	Other
Santa Barbara (1978)	**M5.7**	33%	19%	23%	2%	2%	21%
Imperial County (1979)	**M6.4**	25%	14%	18%	0%	13%	30%
Coalinga (1983)	**M6.7**	32%	14%	23%	1%	5%	25%
Loma Prieta (1989)	**M6.9**	7%	39%	22%	N/A	0%	32%
Northridge (1994)	**M6.7**	31%	13%	6%	11%	4%	35%

The AIR model also estimates the probabilities, or rates, of injury severity for each of the damage states of each construction class. There are four injury severity levels used in the AIR model, as shown in Table 16.

Table 16. Injury Severity Levels Used for Workers Compensation (FEMA 2009)

Severity Level	Description
Minor	Basic medical aid that can be administered by paraprofessionals is sufficient. Examples are sprains, severe cuts requiring stitches, minor burns, and bumps on the head without loss of consciousness.
Moderate	The use of medical technology such as x-rays or surgery is needed, but the injury is not life-threatening. Examples include second or third degree burns over large parts of the body, bumps on the head that cause loss of consciousness, fractured bones, and dehydration.
Life-Threatening	Injuries pose an immediate life-threatening condition if they are not treated expeditiously. Examples include: uncontrolled bleeding, spinal injuries, and crush syndrome.
Fatal	Person is instantaneously killed or mortally injured.

Calculating the Number of Casualties

To estimate the number of casualties that correspond to different combinations of damage states and injury severity levels, the AIR model uses an event-tree framework, such as the one shown in Figure 106. By following the event tree, the number of casualties for each of the four injury severity levels is estimated separately for each building damage state. The casualty numbers are then combined according to their associated probabilities to produce the total injury estimation for a building.

This calculation is completed for the damage states for each construction type. Casualty rates depend to a large degree on construction type. For example, the casualty rate for a wooden house differs significantly from that of a high-rise concrete building.

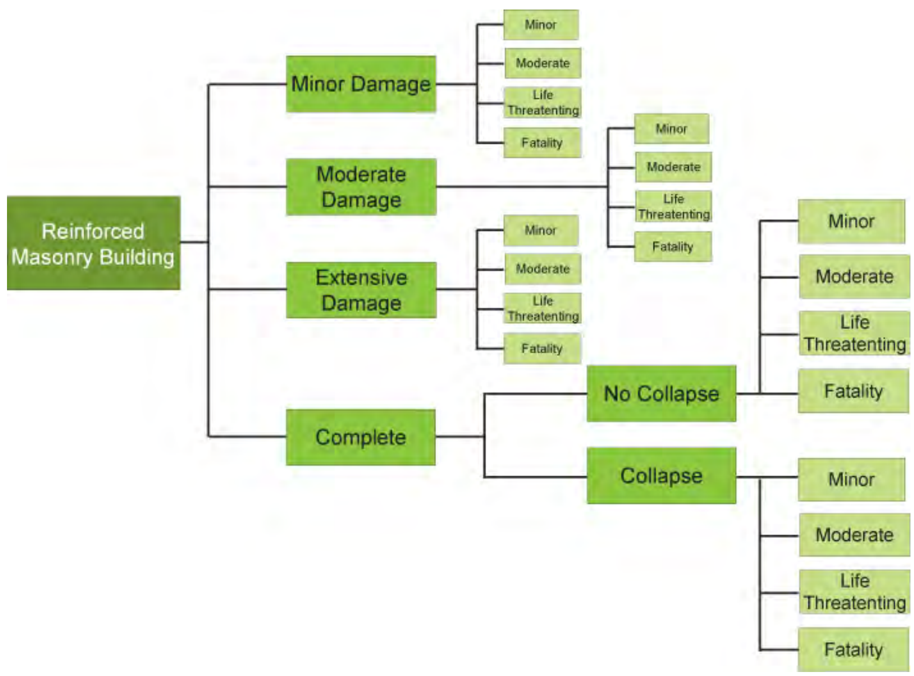

Figure 106: Injury Severity Level by Building Damage State for a Reinforced Masonry Building

Calculating the number of casualties due to an earthquake is a complex process because each building damage state must be correlated with the likelihood of injury and the severity level. Injury rates are separately derived for each injury level and are conditional on the building's damage state. They are derived using casualty data from historical earthquakes in the United States (FEMA 2009 and Peek-Asa et al. 2000).

Estimating Workers Compensation Losses

For each injury severity category an estimate of the number of workers that are injured is calculated using a probabilistic process that accounts for inherent uncertainties. First, the injury rate distribution is applied to the number of employees present in the building. The cost of the injuries, which also varies by their severity, is then applied and summed probabilistically to achieve an estimate of total workers compensation losses for that building (Figure 107).

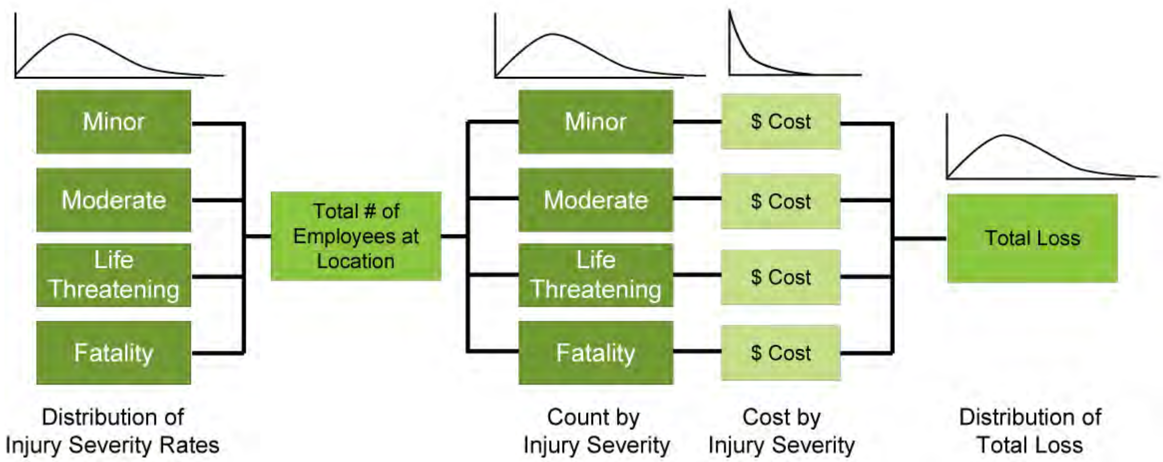

Figure 107: Calculation of Workers Compensation Loss for an Individual Building

The total number of workers at each location is derived using a comprehensive business demographics database of U.S. businesses and employee counts from a premier market research company. In the AIR model, the estimate of the percentage of workers who are injured depends on the day of the week and the time of day that the earthquake took place.

The model utilizes a six-day work week (since many businesses operate on Saturday or Sunday). Daytime is defined as the hours from 9 a.m. to 5 p.m., while night is defined as 7 p.m. to 7 a.m. Separating these time periods are two commuting periods: one from 7 a.m. to 9 a.m. and another from 5 p.m. to 7 p.m. Therefore, for the days Monday-Saturday, the model assumes an 8-hour working period, 4 hours of commute time, and a 12-hour night. (Sunday falls into the same category as night.) This means that there is less than a 30% probability that an earthquake, which can occur at any time of day or night with equal probability, will occur during the hours when the majority of employees are at work. The difference in the number of workers during each of the three time periods has a direct consequence on the estimated number of casualties.

Developing Default Injury Costs and Benefit Levels

Estimates of workers compensation losses are calculated based on the number of employees who have sustained injuries at each severity level and on the cost of the injury, which depends on its severity as well as the location of the workplace. In cases where claims costs are not provided by the client, the model uses objective average costs, specific for each state.

The mental stress that usually accompanies catastrophic events is also taken into consideration. An adjustment is made to the average cost of nonfatal injuries to incorporate an increased level of mental stress. The amount of the adjustment is based on the "mental stress" historically associated with an injury using observational data.

5.17 Sprinkler Leakage Damage

The AIR Earthquake Model for the United States features a separate module to estimate losses to commercial and industrial (300-series) properties caused by the breakage and subsequent leakage of fire sprinkler pipes[14] due to ground shaking. The module takes into account advances in technology, as well as building code and practice through regional and age modifiers. It also recognizes differences in vulnerability to water damage of individual non-structural building components and different types of contents.

The sprinkler leakage module estimates losses to commercial and industrial buildings (non-structural components only) and contents, as well as those stemming from business interruption. The development of the sprinkler leakage damage functions is based on both original and published research, including the work of Comerio and Bertero (2000). In that study, which uses data from the Northridge (1994) and Nisqually (2001) earthquakes, the authors estimate water damage ratios for non-structural building components and contents as a function of building damage state. The damage states, which are consistent with those from SEAOC's Vision 2000, are given as a relative ranking from 0 (complete, or collapse) to 10 (negligible). By mapping these damage states to damage ratios suggested in ATC-13, AIR developed a "base" damage function, which takes the general form illustrated below in Figure 108.

[14] Note that the module includes leakage from all water pipes within a building. However, pipes other than fire sprinkler pipes are much less vulnerable, less prevalent throughout the building and therefore contribute minimally to total losses from water damage.

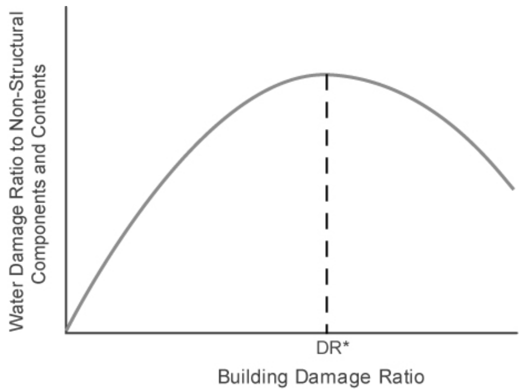

Figure 108: General Form of the AIR Sprinkler Leakage Damage Function

Note that beyond some building damage ratio, DR*, the water damage ratio actually decreases. This threshold damage ratio represents ground shaking sufficiently severe to cause the breakage of the water mains that supply sprinkler systems. Beyond this level of intensity, water pressure and therefore water damage is reduced.

Expert judgment is used to determine the vulnerability of contents, which vary by occupancy, to water damage. A relative ranking of contents vulnerability and thus damage functions by occupancy class is developed, as illustrated schematically in Figure 109.

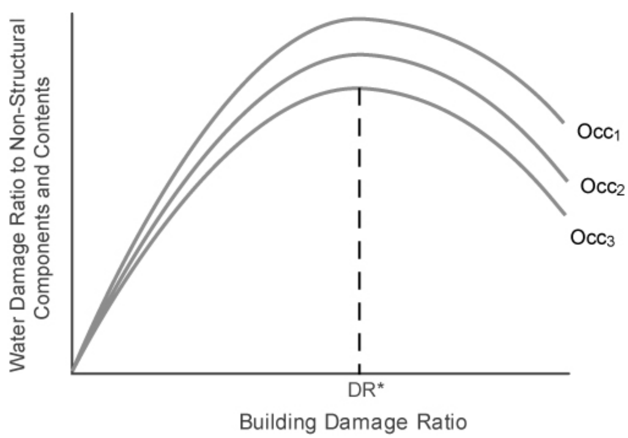

Figure 109: Relative Ranking of Contents Damage Functions by Occupancy Class

In the case of Coverage A, the module assumes that only non-structural components are water-damageable. The value of such non-structural elements as a percentage of total building value for various occupancy classes is provided by the detailed databases that support AIR's property replacement value estimation products. AIR construction engineers estimated the vulnerability to water damage of each component type, including interior walls, ceilings, floor finishes, wiring and fixtures, etc. Similar to the approach used for contents, this information is used to develop a relative ranking of non-structural component damage functions by occupancy class.

Time element damage functions are developed based on the estimates of the number of days needed for repair or replacement of both contents and non-structural building components. Note that these are not additive. In some cases, contents can be replaced while non-structural repairs are underway. In other cases, this may not be true.

Two or more variables (in this case contents and non-structural damage) that have a common source (earthquake ground-shaking), but whose values are not directly correlated, are called “orthogonal” and are appropriately combined by way of the square root of the sum of the squares.

Regional Modifiers

The AIR sprinkler leakage damage module employs regional modifiers. Construction techniques and building practices generally reflect the relative hazard experience of different regions. Because of its historical experience with respect to seismic activity and its stringent seismic code, structures in California are assumed to be the least vulnerable to earthquake shake, while structures in the Central and Eastern United States are the most vulnerable. The Pacific Northwest (Washington and Oregon only) ranks second to California.

Age Modifiers

Age also plays a role in vulnerability, though its effects are complex. The materials used in the non-structural components of newer buildings are generally more vulnerable to water than older materials found in older buildings. Also, newer buildings will, in general, have newer contents, many of which—electronic equipment, in particular—are more vulnerable than older contents.

However, sprinkler systems in newer buildings are less likely to break. Built to more stringent code establishing requirements for longitudinal and lateral bracing, and the amount of clearance around piping, as well as benefiting from technological improvements such as flexible couplings, the sprinkler systems in newer buildings are less vulnerable to earthquake shake. While the effect of overall building vulnerability dominates the vulnerability of either non-structural components or contents, both effects are taken into account in the AIR model.

Secondary Uncertainty

The AIR sprinkler leakage loss module is fully probabilistic and takes into account secondary uncertainty. Damage from sprinkler leakage is modeled as a function of building damage. The model accounts for uncertainty in the level of sprinkler leakage damage given a building damage ratio, as well as uncertainty in the building damage ratio given a level of ground motion. These two distributions are combined by way of simulation to obtain the final damage distribution.

General Impact of Sprinkler Leakage Damage on Earthquake Loss Estimates

The impact of the sprinkler leakage loss module on overall earthquake shake losses is quite small. The probability of sprinkler leakage damage is the product of the probability that pipes will break and the probability that building components and contents are exposed to and actually damaged by water. The first probability is estimated to be quite low.

5.18 Validating the Model's Damage Estimation Module

As discussed in Section 5.7, the model's damage functions report the mean damage ratio for each level of intensity, where the mean damage ratio is the ratio of the repair cost of the building or contents to its replacement value. Thus validating the damage estimation component of the model is inextricably intertwined with validating modeled losses. A discussion of modeled loss validation can be found in Section 7.2. Validating event losses, which accounts for ground motion, vulnerability, and industry inventory data, ensures a model's overall performance.

Nevertheless, a sample of additional validation exhibits relating to the model's damage functions and estimates of fire-following and workers compensation losses are provided below.

Validating the Model's Damage Functions

Perhaps the most significant advance in the vulnerability module is the shift from static pushover analysis with the more realistic nonlinear dynamic analysis, or NDA. This relatively new theoretical framework for the seismic design of new buildings and the seismic performance evaluation of existing ones has become firmly established in the academic and engineering communities and represents a radical shift from the traditional reliance on prescriptive building codes

When NDA is used on detailed three-dimensional models of buildings, the prediction of the building response is extremely accurate. Figure 110 shows a three-dimensional computer model developed by AIR of a seven-story reinforced concrete moment-resisting frame building in Van Nuys, California, that experienced the Northridge earthquake in 1994.

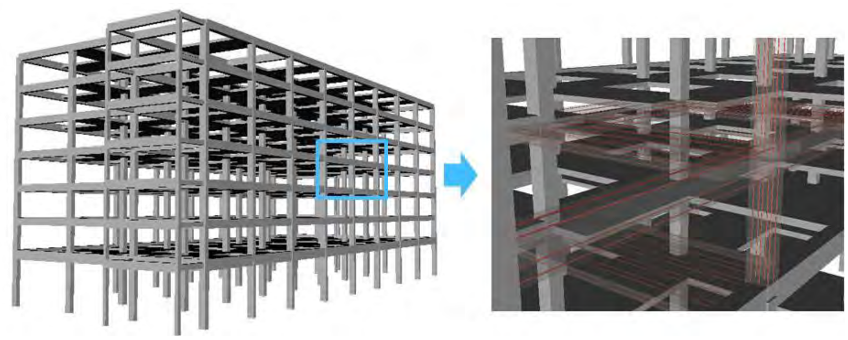

Figure 110. Model of an Existing Reinforced Concrete Frame Building that was Instrumented during the 1994 Northridge Earthquake

The red lines in the image on the right indicate steel reinforcing bars in the columns and slabs of the building. Since this building was instrumented to record its behavior, and its deformation and damage are known, it represents an excellent benchmark for assessing the accuracy of NDA to predict the response of actual buildings to earthquakes.

Figure 111 displays the predicted interstory drift ratio of the building in Figure 110 when subjected to the 1994 Northridge earthquake ground motion recorded at the building site. The figure compares the modeled response of the building (blue line) to its actual response that was recorded during the earthquake (red line). The results show remarkable agreement as testimony to the accuracy that NDA provides when estimating building deformation during ground shaking.

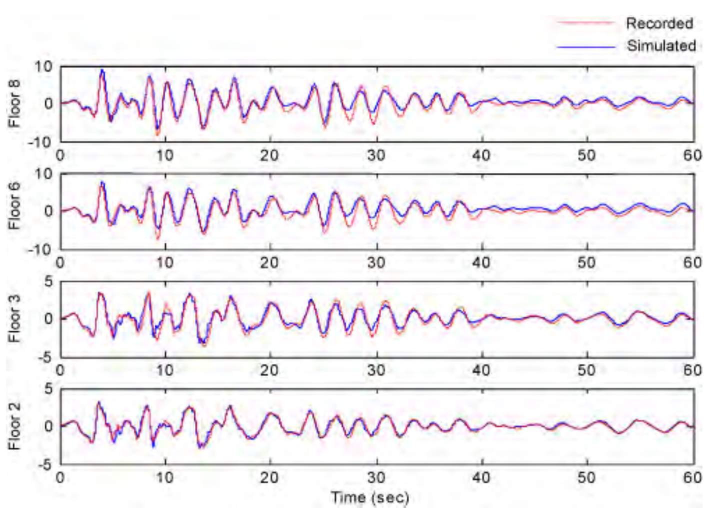

Figure 111. Comparison of Simulated and Recorded Floor Displacement during the 1994 Northridge Earthquake

At the industry level, the damage functions developed using NDA produce realistic damage footprints, as illustrated in Figure 112 and Figure 113.

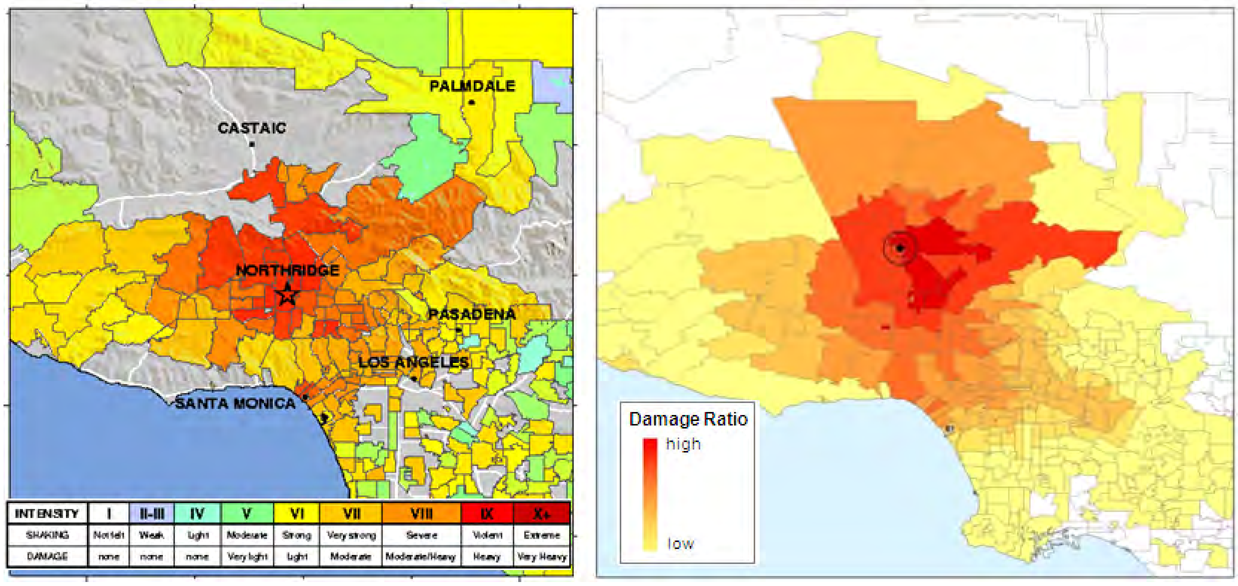

Figure 112. Comparison between USGS MMI Map for the 1994 Northridge Earthquake (left) and AIR Modeled Damage Ratios (right)

Figure 112 provides a comparison between the Modified Mercalli Intensity (MII) map produced by the USGS for the 1944 Northridge earthquake and a map of damage ratios produced by the AIR model for this event. Figure 113 shows a similar comparison but for the 1989 Loma Prieta earthquake. Please note that in these exhibits, damage ratios are being compared to reported intensity. Note, too, that Zip code boundaries have changed since these two events. Nevertheless, both show good agreement.

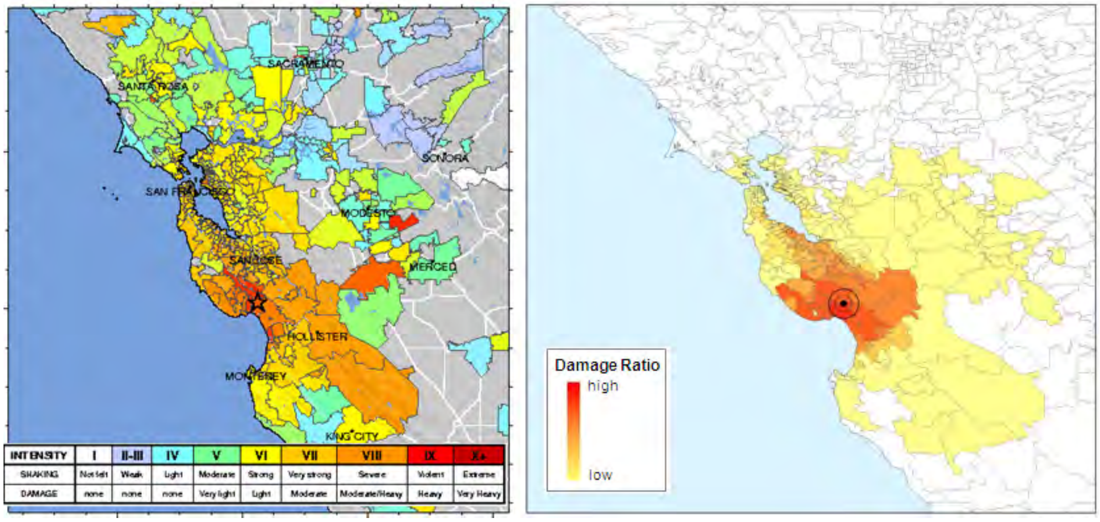

Figure 113. Comparison between USGS MMI Map for the 1989 Loma Prieta Earthquake and AIR Modeled Damage Ratios

As discussed above, contents damage is a function of spectral acceleration and occupancy in the AIR model. Figure 114 shows the comparison of the contents damage function in the model and contents claims data from the 1994 Northridge earthquake.

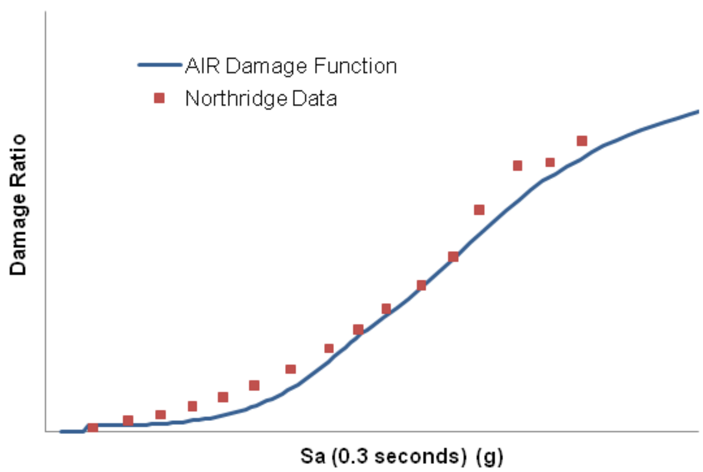

Figure 114. Northridge Claims Data and AIR Damage Function for Residential Contents

As discussed above, Additional Living Expenses, or ALE, loss is a function of the mean building damage. Figure 115 shows a comparison of the AIR damage function and ALE claims from the 1994 Northridge earthquake.

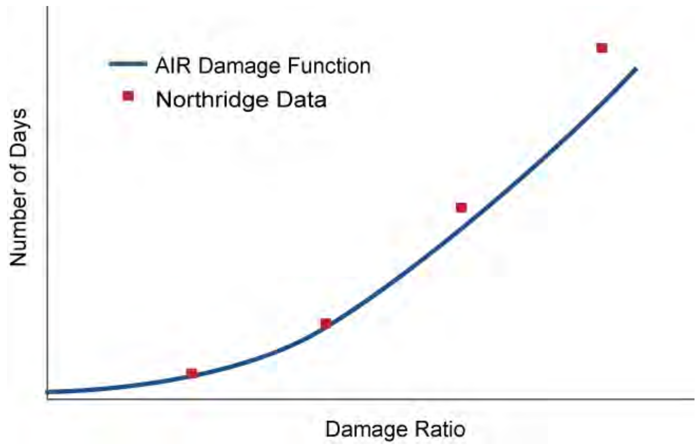

Figure 115. Northridge Claims Data and AIR Damage Function for Residential Additional Living Expenses

Validating the Distribution of Damage

As was discussed in Section 5.7, similar structures at the same location may experience different levels of damage. To capture this uncertainty in damage, the AIR model constructs distributions around the mean damage ratio.

Although beta distributions are commonly used, they do not accurately reflect variation in damage. Following an extensive analysis of claims data, AIR engineers found that a combination of two beta distributions (referred to here as a bi-beta distribution) better represents this uncertainty. Figure 116 and Figure 117 compare the bi-beta modeled and observed damage distributions.

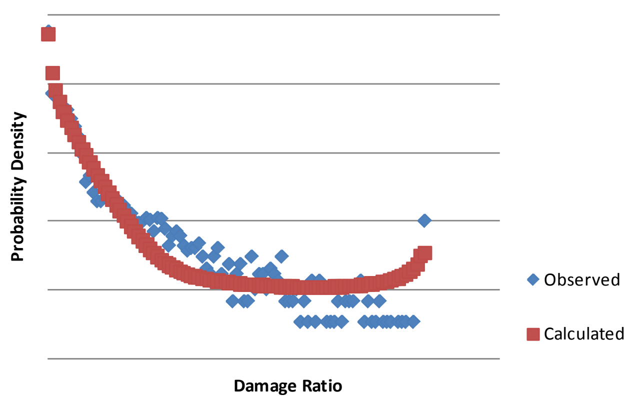

Figure 116. Modeled vs. Observed Probability Distributions

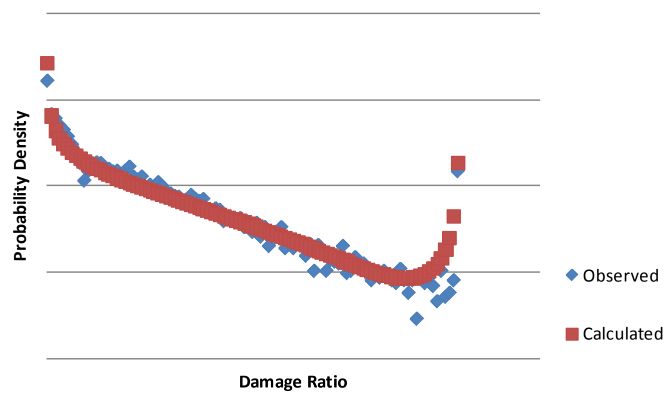

Figure 117. Modeled vs. Observed Probability Distributions

Validating Fire Following Damage

Figure 118 illustrates the locations of actual fire ignitions associated with the 1994 Northridge earthquake. Figure 119 illustrates the locations of simulated fire ignitions associated with the same event, assuming 2008 exposures. The simulated ignitions are from a single fire simulation. The two figures demonstrate reasonably good agreement regarding the locations of simulated and actual ignitions.

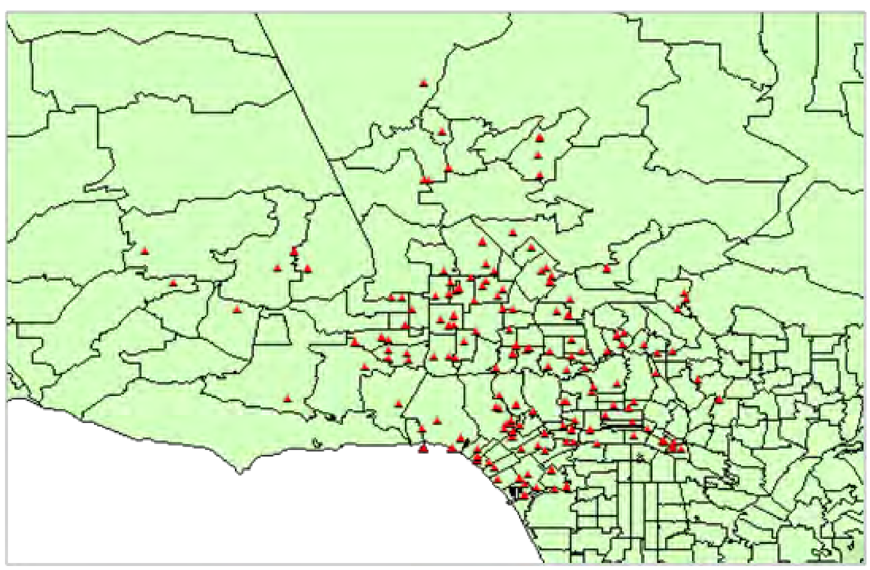

Figure 118. Observed Ignitions for the 1994 Northridge Earthquake

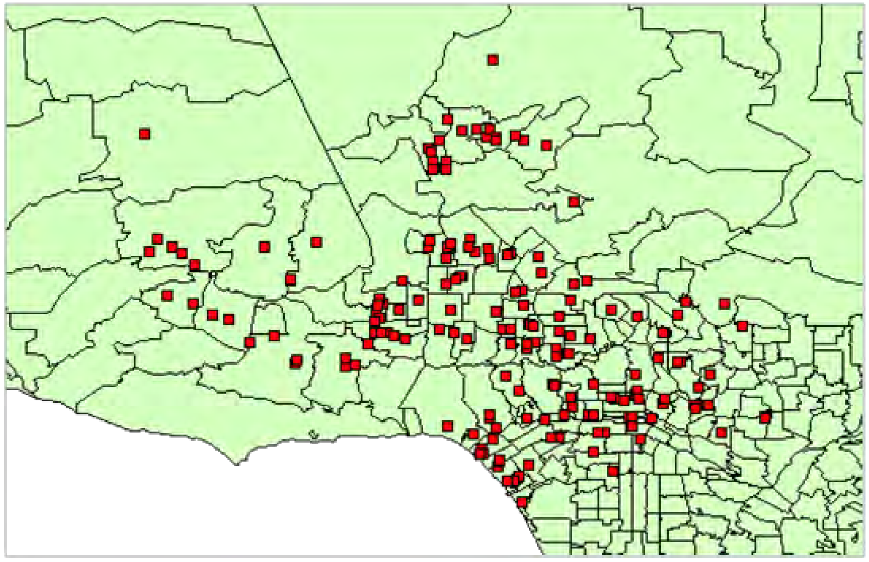

Figure 119. Simulated Ignitions for the 1994 Northridge Earthquake, Assuming 2008 Exposures

Figure 120 illustrates the spatial distribution of exposure density and the modeled peak ground acceleration (PGA) contours associated with a repeat of the 1994 Northridge earthquake. Also shown are the average modeled fire damage ratios for combustible exposures. Figure 121 is similar to Figure 120 except that it shows average modeled fire damage ratios for noncombustible exposures. The modeled fire damage ratios tend to be higher for combustible than for noncombustible exposures, as expected.

The likelihood of fire damage depends on both ground motion and exposure density. For most earthquakes, the locations with the highest levels of ground motion and exposure density do not coincide. Therefore, in most cases, the highest fire damage ratios are likely to occur where either or both the exposure density and ground motion are not at their highest levels.

In the case of the 1994 Northridge earthquake, the model predicts that the highest fire damage ratios occur where there is a relatively high exposure density and slightly less than the highest levels of ground motion. This occurs near the center of Figure 120 , where the concentration of dark-colored squares is highest. A similar pattern is observed in Figure 121.

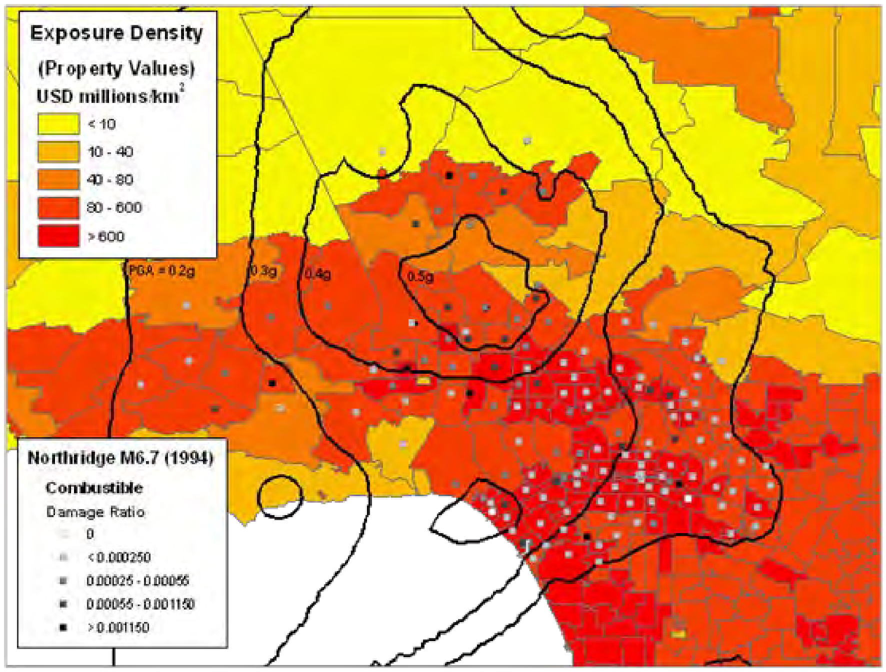

Figure 120. Exposure Density, Simulated PGA Contours, and Mean Damage Ratios for Combustible Exposures, Repeat of the 1994 Northridge Earthquake

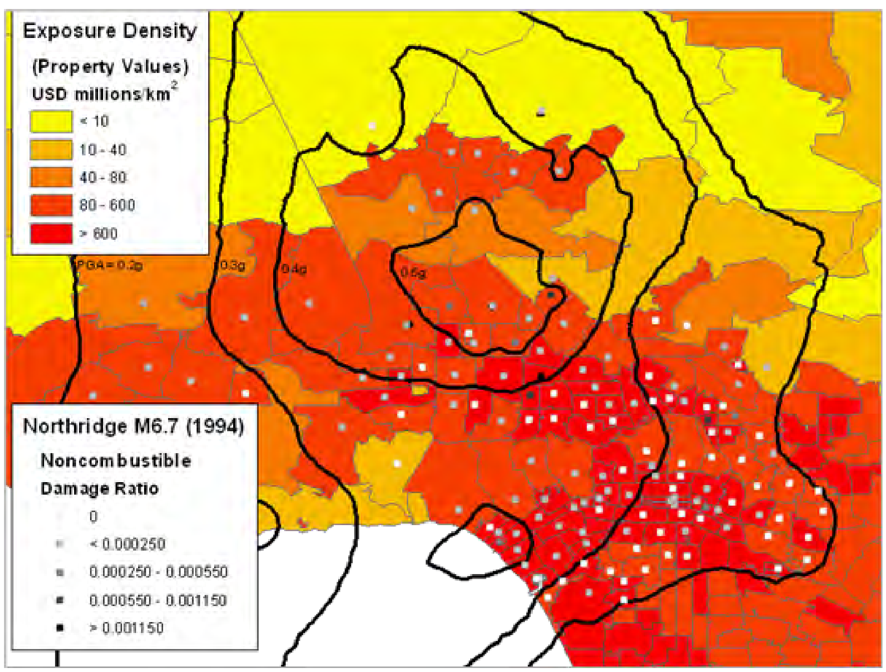

Figure 121. Exposure Density, Simulated PGA Contours, and Mean Damage Ratios for Noncombustible Exposures, Repeat of the 1994 Northridge Earthquake

Figure 122 illustrates the spatial distribution of exposure density and the modeled PGA contours associated with a repeat of the 1906 San Francisco earthquake. Also displayed are the average modeled fire damage ratios for combustible exposures. Figure 123 is similar to Figure 122 except that it shows the average modeled damage ratios for noncombustible exposures.

In the case of the 1906 San Francisco earthquake, the model predicts that the highest fire damage ratios occur where the exposure density and PGA values are both relatively high, in the lower half of each figure, west, south, and southeast of San Francisco Bay.

The actual earthquake occurred more than 100 years ago and affected a very different exposure distribution. While the AIR Earthquake Model for the United States predicts that in a repeat of the 1906 San Francisco earthquake, with the present exposure distribution, about 15% of the ground-up damage would be due to fire, in the actual event, 80-90% of the damage was due to fire. The difference is explained by a number of reasons. First the building stock in San Francisco in 1906 was not built to withstand earthquakes, so there was more shake damage than would occur today; the higher levels of shake damage resulted in higher ignition rates. Also, a large percentage of the building stock was made of wood and was therefore highly combustible. Finally, much of the fire damage resulted from the use of dynamite, which was employed in the misguided effort to create firebreaks.

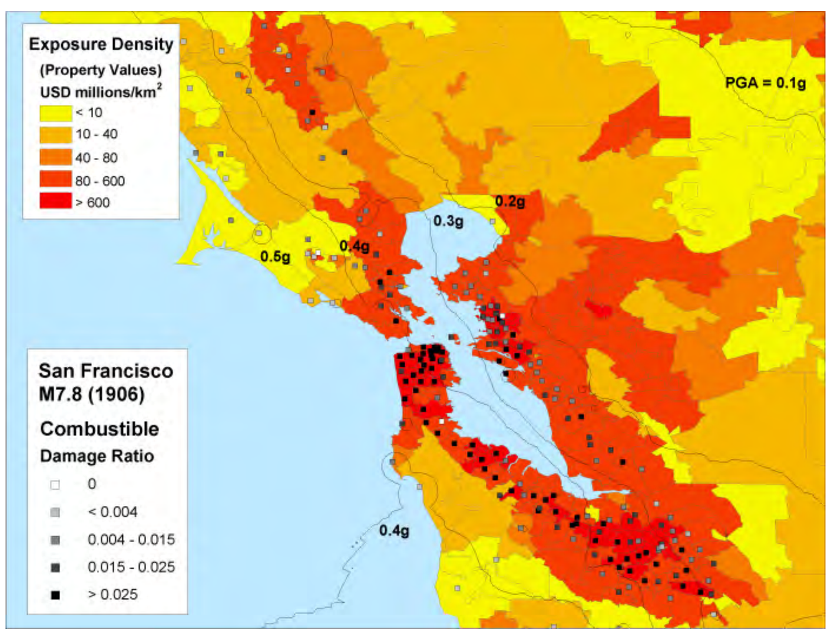

Figure 122. Exposure Density, Simulated PGA Contours, and Damage Ratios for Combustible Exposures, Repeat of the 1906 San Francisco Earthquake

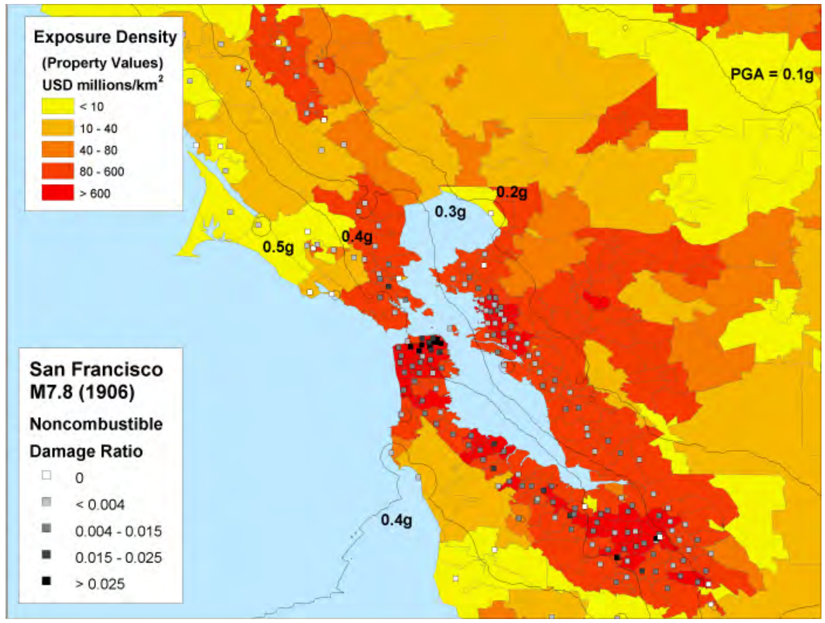

Figure 123. Exposure Density, Simulated PGA Contours, and Damage Ratios for Noncombustible Exposures, Repeat of the 1906 San Francisco Earthquake

Figure 124 illustrates the spatial distribution of exposure density and the modeled PGA contours associated with a repeat of the 1989 Loma Prieta earthquake. Also displayed are the average modeled fire damage ratios for combustible exposures. Figure 125 is similar to Figure 124 except that it shows the average modeled damage ratios for noncombustible exposures.

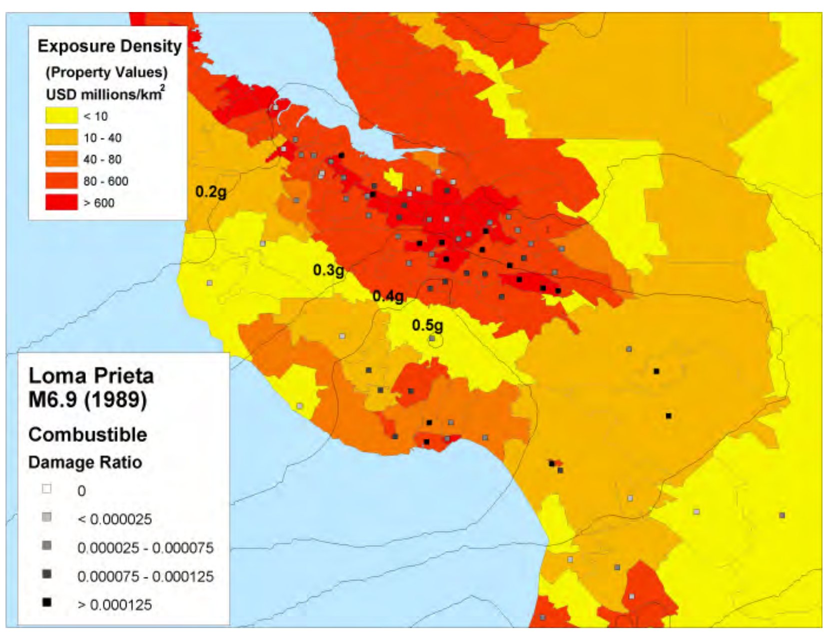

Figure 124. Exposure Density, Simulated PGA Contours, and Damage Ratios for Combustible Exposures, Repeat of the 1989 Loma Prieta Earthquake

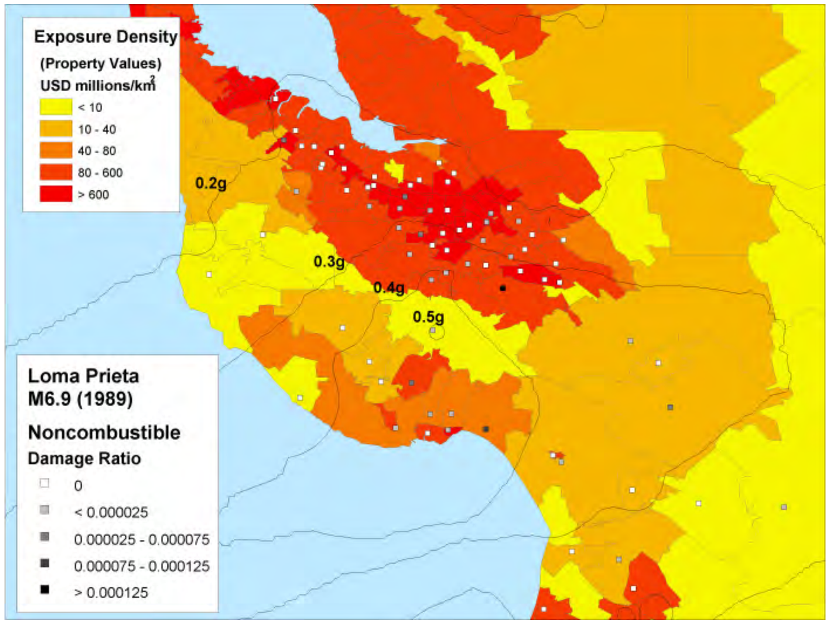

Figure 125. Exposure Density, Simulated PGA Contours, and Damage Ratios for Noncombustible Exposures, Repeat of the 1989 Loma Prieta Earthquake

In the case of the 1989 Loma Prieta earthquake, the model predicts that the highest fire damage ratios occur where the exposure density and PGA values are both relatively high, to the southeast of San Francisco Bay. Reports from the actual earthquake indicate that some of the heaviest fire damage was in Santa Cruz, where two dozen buildings were destroyed by fire caused by the earthquake. As Figure 124 and Figure 125 indicate, the model also predicts heavier damage in those areas. In addition, heavy fire damage was incurred in the Marina District of San Francisco, where 17 fires were reported.

For the 1989 Loma Prieta and the 1994 Northridge earthquakes, actual fire-following losses, adjusted for inflation and exposure growth, are compared to the median and mean modeled losses, as shown in Figure 126. For the Loma Prieta earthquake, the observed loss data is reasonably consistent with both the mean and median modeled losses. For the Northridge earthquake, the mean modeled loss is higher due to the presence of some outliers with large losses among the 50 fire simulations that were run for the event.

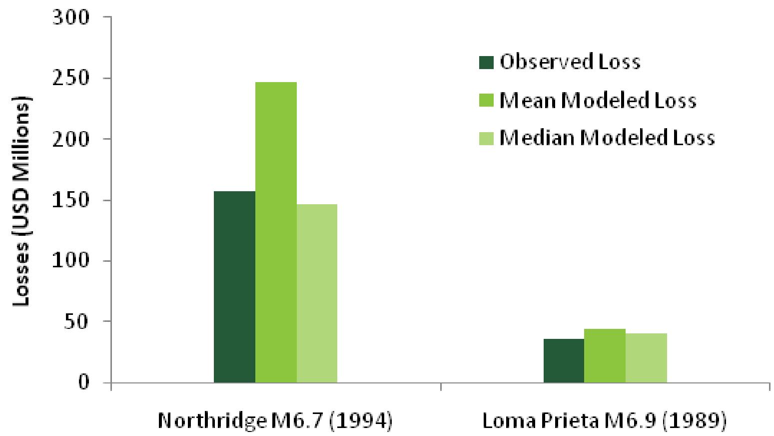

Figure 126. Observed Fire-Following Losses Compared to Mean and Median Modeled Losses for Northridge and Loma Prieta Earthquakes

Validating Modeled Workers Compensation Losses

The workers compensation component of the AIR Earthquake Model for the United States relies on published studies of casualty rates as well as data from actual earthquakes. For validation, however, the availability of appropriate data is limited. Some of the challenges are discussed in this section, along with a comparison between modeled and historical injury counts for some recent earthquakes. Note that a meaningful comparison of losses is made more challenging because of the significant changes in benefit levels that have occurred over time. Note that the modeled results reflect industry exposures as of 2008, both in terms of population and exposed properties.

There is only limited information on workers compensation insurance claims in the United States available to the public. In addition, there is a certain amount of uncertainty regarding the change over time in number of workers and their workplaces. Therefore, a reliable validation uses a comparison between the modeled and historical injury counts based on the total population, rather than on the injury counts of workers.

Table 17 shows the total number of casualties based on observational data after some recent historical earthquakes in California. These observations are compared to the number of casualties that are estimated by the AIR model were these earthquakes to recur today. Given an average population growth of approximately 1.6% annually in California between 1980 and 2008 (U.S. Census Bureau), the number of casualties reported at the time of these events are adjusted based on a formulation (Vranes et al., 2009). These adjusted values provide estimates of the number of casualties that would occur had these events taken place with today's population. With population growth taken into account, the modeled results are within a reasonable range for these earthquakes.

Table 17: Comparison of Observed and Modeled Casualties for Selected Historical Earthquakes in California

Year	Location	Observed Casualties*		Modeled Casualties	
		Nonfatal	Fatal	Nonfatal	Fatal
1987	Whittier	1,913	11	3,015	25
1989	Loma Prieta	5,161	87	8,297	95
1992	Landers	457	1	449	1
1994	Northridge	36,035	76	39,761	81

*Values have been adjusted to account for population growth in California

The uncertainty surrounding the number of injuries and fatalities observed during older earthquake events is considerably greater than for more recent events. This is due to less reliable data for older earthquake, and the fact that the impact of population growth on the number of casualties that would occur if those earthquakes took place today is difficult to predict. Moreover, the improvement in building design as well as increased public awareness of earthquake hazards over the past several decades play an important role in reducing the number of casualties. The combined impact of these factors on the injury counts is not quantifiable, especially in cases where the earthquakes occurred several decades ago.

However, information from all of the past earthquakes can be used to verify the overall model performance. Fatality data from 29 historical earthquakes in the U.S. that occurred between 1886 and 2003 was collected (NOAA, 1972; Cutter et al., 2005; Ramirez et al., 2005; and Vranes et al., 2009) and compared with the model estimates.

Figure 127 shows a scatter plot of observed and modeled fatalities. The horizontal line associated with each event indicates a range of the observed fatalities, suggesting uncertainties in the observed numbers. While the model underestimates the fatalities for some of the events and overestimates for others, the plots are tightly scattered around the 45° line, which indicates that the model estimates in general are reasonable and that the model does not have a bias.

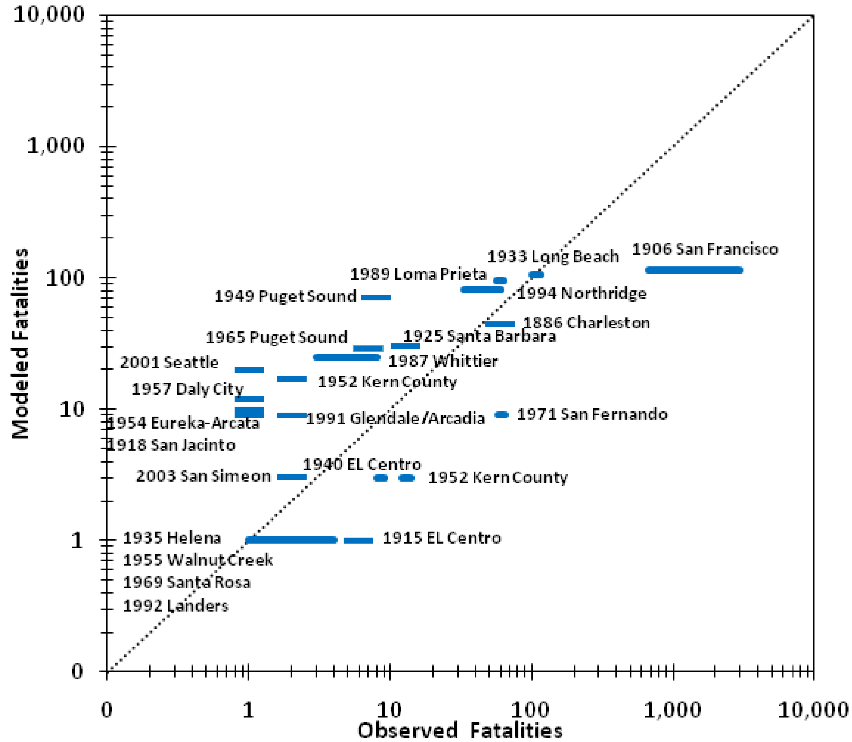

Figure 127: Modeled vs. Observed Fatalities from 29 Historical Earthquakes in the U.S.

The loss estimates produced by the AIR workers compensation module are well within the range of reasonability when compared to the available historical data. Although there have been no significant casualties from earthquakes since the 1906 event in San Francisco, there is no doubt that earthquakes pose a significant hazard. It is therefore important to use a realistic modeling approach for workers compensation to determine injuries due to ground shaking from earthquakes.

6 Estimating Damage to Industrial Facilities

The AIR Earthquake Model for the United States assesses property and business interruption (BI) losses for industrial facilities due to earthquake-induced ground shaking, fire following earthquakes and liquefaction. This section focuses on the damage functions used for large industrial facilities. These facilities contain a wide range of components, some of which are shown in Figure 128. The damage functions for large industrial facilities are included with the 400-series of CLASIC/2 occupancy classes.

Figure 128. Some Industrial Facility Components

To assess the damage and loss potential to a large facility as a whole, AIR employed a component-based approach, which allows the damage functions to account for the many primary components intrinsic to this type of facility. These primary components are categorized into classes and subclasses based on their function as well as their vulnerability to ground shaking, and AIR developed separate damage functions for each of more than 400 such components. AIR also obtained the valuation breakdown of a facility according to its components, and combined this information with the component damage functions to derive the damage function for an entire industrial facility.

This approach provides loss estimates that are transparent and consistent across different facilities. Furthermore, the component-based approach is essential for a reliable assessment of business interruption (BI) losses, which depend heavily on the numerous interactions between the various components and lifelines within industrial sites.

Developing Component-Level Damage Functions

To predict the response of an industrial facility exposed to ground shaking, the AIR model uses peak ground acceleration (PGA). Since the components are parts of a larger facility, a unique ground motion parameter has been used to estimate the response of all of the components. Using PGA as a ground motion parameter for assessing vulnerability of industrial components is advantageous for four reasons. First, the majority of components (e.g., machinery and equipment) in industrial plants are anchored and fairly rigid, and therefore PGA correlates well with their performance. Second, as discussed later in this section, the damage functions for an entire industrial facility are obtained using a weighted average of component damage functions. This process can be streamlined without adding uncertainties in the process of aggregation of different components by using the same ground motion parameter for all components. Thirdly, some of the component damage functions developed by different researchers are generally PGA-based and therefore using PGA facilitates the consideration of damage functions already available. Finally, historical damage data for industrial plants is often available along with an estimate of the PGA at the site. Estimates of other ground motion parameters are generally not reported.

Some 400 industrial components are included in the AIR model. The main categories of components are listed in Table 18, but each has many sub-classes. All components chosen for analysis represent actual industrial facilities. They were selected from structural drawings, design specifications and other sources.

Table 18. Industrial Facility Components used in the AIR Earthquake Model for the United States

Industrial Facility Components		
Air Handling Units	Distribution Panels	Open-Frame Structures
Baffles	Electric Power Backup	Paddles
Basins	Electric Transmission Towers	Pipe Racks
Battery Chargers	Elevated Pipes	Pipes and Pipelines
Battery Racks	Engine Generators	Potential Transformers
Boiler/Pressure Vessels	Equipment	Pressurized Reactors
Boilers	Fans	Process Towers
Buildings	Filter Gallery	Pumps
Chillers	Flares	Scrapers
Chlorination Equipment	Generators	Sediment Flocculation Equipment
Circuit Breakers	Highways/Runways/Railroads	Silos
Commercial Backup Power	Large Horizontal Vessels	Stacks/Chimneys
Compressors	Large Motor-Operated Valves	Switch Gears
Control Panels	Large Vertical Vessels with Formed Head	Tanks
Cooling Towers	Lightning Arrestors	Transformers
Coupling Capacitors	Loading Structures (Cranes/Cargo Handling/Conveyor Systems)	Tunnels
Current Transformers	Motor Control Centers	Wells
Dams	Large Motor-Operated Valves	Valves
Disconnect Switches	Motor-Driven Pumps	

The damage functions derived for each component, in general, vary depending on the region where the facility is located. This is because the seismic hazard and, therefore, the design specifications are different in different parts of the United States. Therefore, for each component and subcomponent, AIR developed different damage functions for each of the three seismic regions of the country: California, Washington and Oregon, and all other states.

Figure 129 illustrates damage functions for the most common components found in industrial facilities in California. Similar sets of component functions were obtained for Oregon and Washington, and for all other states.

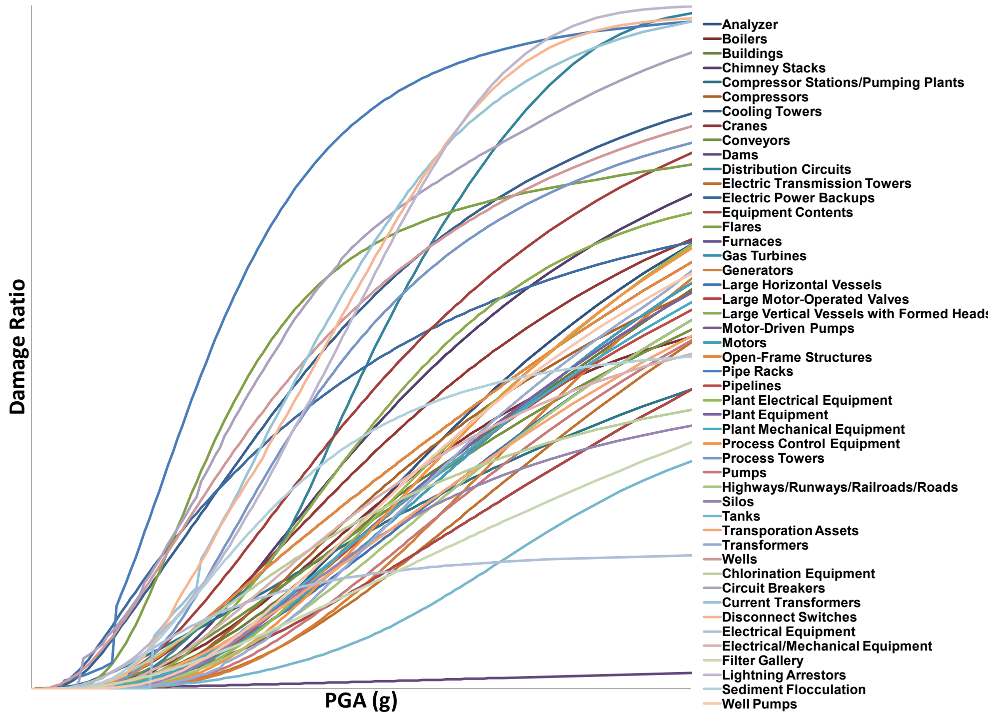

Figure 129. Damage Functions for Industrial Facility Components in California

The following sections describe the different methods that were used to develop the component-level damage functions.

Damage Functions for Buildings

As stated earlier, the damage functions for small industrial facilities were developed with the assumption that the facility comprises primarily buildings and some machinery. The damage functions for small facilities were therefore developed based on the building damage functions for different construction classes. These damage functions are identical to the building damage functions for large industrial facilities. However, since the cost of the components for the large industrial facilities is generally more than 80% of the cost of the facilities, there is significant difference between the damage functions for large and the small facilities. To derive the building damage functions for each type of facility (e.g., heavy fabrication), AIR obtained a weighted average of all the damage functions for different types of low-rise buildings that are present in the industry exposure for that type of facility. The weights assigned to each damage function are simply the fraction of each building type in the mix. This process was completed for each seismic region to obtain a building damage function for each industrial type.

Table 19 shows an example of the weights used to obtain the damage function for buildings within an industrial site in different regions of the United States. The table shows, for each seismic zone, the construction distribution used for low-rise buildings in heavy fabrication and assembly plants.

Table 19. Construction Distribution for Heavy Fabrication and Assembly Plants in each Seismic Zone, for Low-Rise Buildings

Wood		Masonry				Concrete				Steel			
Wood Frame–Modern	Heavy Timber	Unreinforced Masonry–Load-Bearing Wall	Unreinforced Masonry–Load-Bearing Frame	Reinforced Masonry	Reinforced Masonry–Shear Wall with MRF	Reinforced Concrete–Shear wall with MRF	Reinforced Concrete MRF–Ductile	Tilt-up	Poured Concrete	Light Metal	Braced Steel Frame	MRF–Perimeter	MRF – Distributed
California													
34.0%	3.2%	1.3%	0.0%	10.3%	2.1%	10.7%	0.2%	0.5%	3.0%	6.2%	18.4%	5.8%	4.2%
Washington and Oregon													
41.9%	2.2%	1.3%	0.0%	6.5%	1.2%	8.7%	0.7%	1.4%	2.5%	4.3%	16.4%	9.5%	3.5%
All Other States													
27.6%	5.5%	12.2%	0.8%	1.7%	2.4%	1.0%	0.9%	2.9%	2.0%	19.0%	5.7%	7.7%	10.6%

Figure 130 shows the damage functions for the different building construction classes specified in Table 2 that are often found within industrial facilities in California. Since different types of industrial facilities (e.g., chemical plants versus manufacturing plants) have a different mix of building types, the overall damage functions for buildings vary depending on the type of industrial facility. Figure 131 shows the derived building damage functions for various industrial facility types in California.

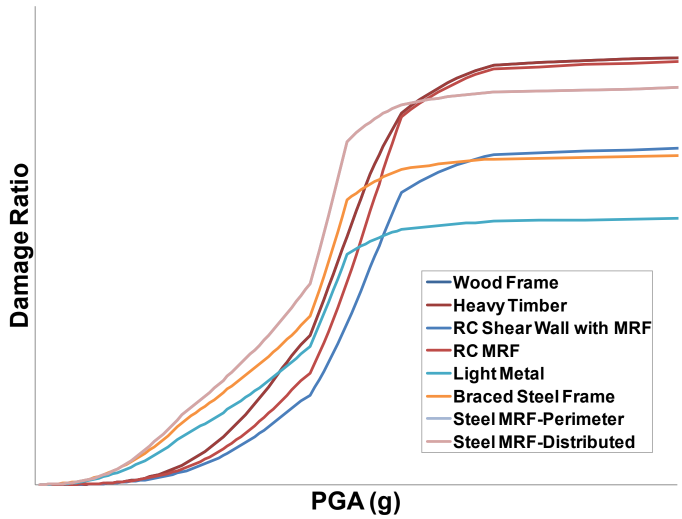

Figure 130. Building Damage Functions in California

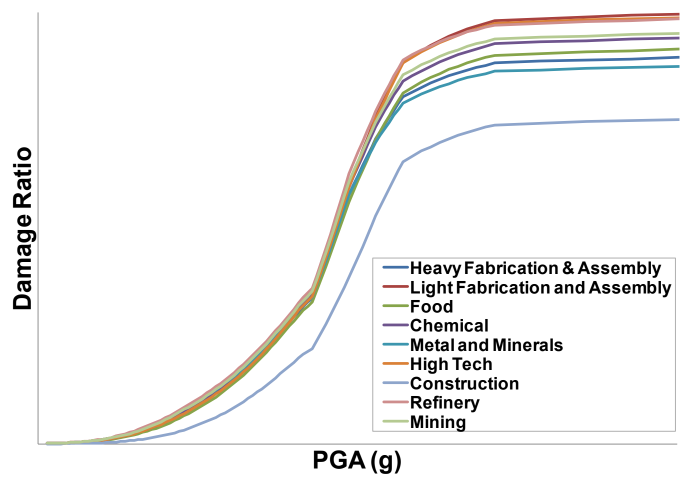

Figure 131. Building Damage Functions for Various Industrial Facilities in California

Damage Functions for Components Derived from Observational Data

For tanks, dams, tunnels, and several other components, damage data are available from historical records and publications. For these components, damage functions have been derived using a combination of observational data from historical earthquakes and engineering studies.

The following figures show damage functions for tanks from published literature. Figure 132 uses the generic tank type (e.g., the average functions of unanchored and anchored, fill-level, etc.). Figure 133 shows on-grade tanks, and tanks with specific anchorage type and fill-level. The final damage function is the average of these damage functions.

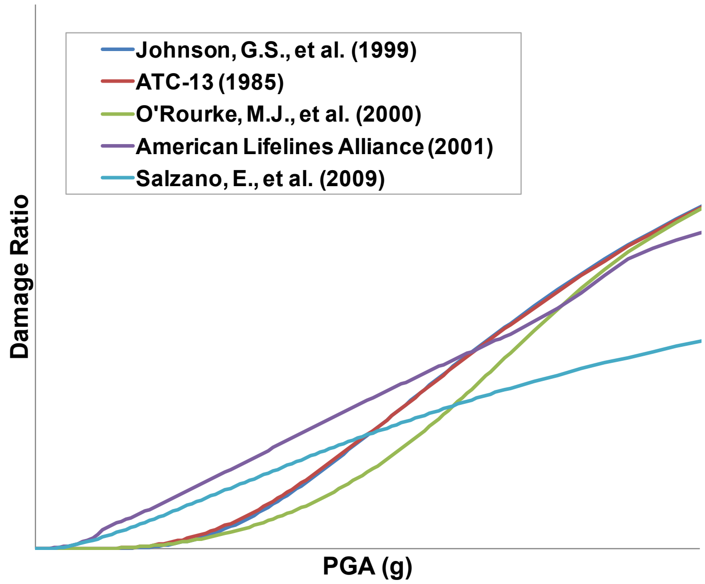

Figure 132. Damage Functions for Tanks Based on Technical Literature and Reviews, Average Damage from Each Source

Figure 133 shows damage functions for tanks with different filling ratios and anchoring conditions, derived from observational data. The moving average of all data, shown with the dotted black line, is seen to cross the middle of these functions. The damage functions in Figure 132 and Figure 133 are combined to obtain the damage functions for tanks with different characteristics.

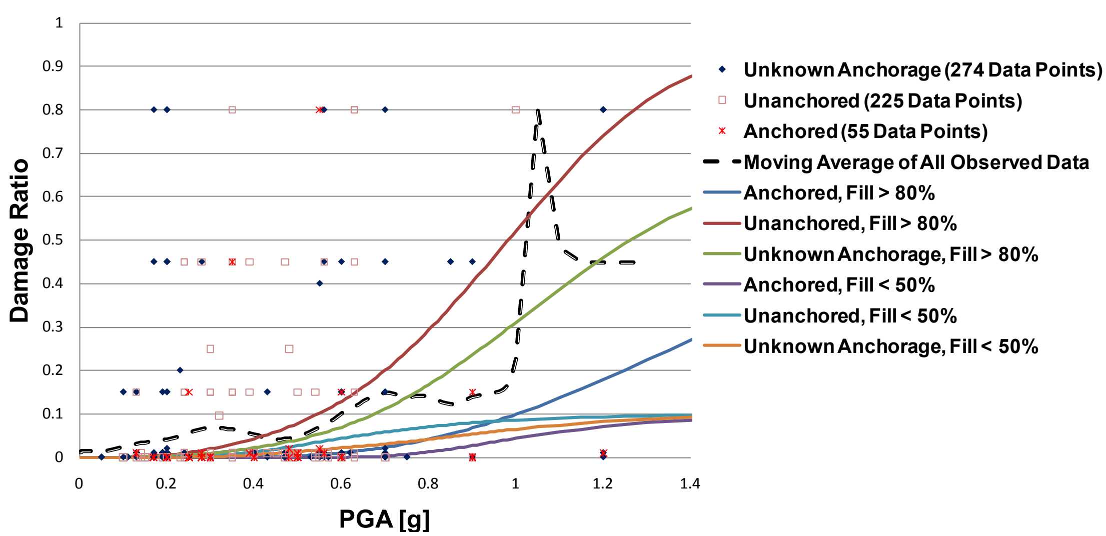

Figure 133. Damage Functions for On-Grade Tanks Based on Observed Damage Data

The data in Figure 133 is observational data collected from 19 historical earthquakes, which are listed in Table 20.

Table 20. Historical Earthquakes Used for Tank Damage Data

Earthquake	Year
Long Beach, CA	1933
Kern County, CA	1952
Alaska	1964
San Fernando, CA	1971
Imperial Valley, CA	1979
Coalinga, CA	1983
Morgan Hill, CA	1984
Loma Prieta, CA	1989
Costa Rica	1992
Landers, CA	1992

Earthquake	Year
Northridge, CA	1994
Kobe, Japan	1995
Chichi (Jiji), Taiwan	1999
Izmit, Turkey	1999
Athens, Greece	1999
Nisqually, WA	2001
Southern Peru	2001
Bam, Iran	2003
San Simeon, CA	2003

Component Damage Functions Derived from Nonlinear Structural Analysis

For many industrial components (e.g., chimneys, cooling towers, flare towers, open-frame structures, pipes, pipe racks, process towers, and silos), there is insufficient damage data or studies in the literature to derive damage functions accurately. In these cases, AIR used engineering analyses—primarily nonlinear static pushover analyses (see Section 5.5 for more detail). Most industrial components are simple structures and vibrate in essentially one mode, which makes static pushover analysis appropriate. All analyses were carried out in accordance with state-of-the-art, performance-based provisions, taking into account the complexity of each component and its characteristic response to shaking.

Structural models were subjected to a progressively increasing lateral force (corresponding to increasing levels of ground motion) to evaluate the trigger of key limit states, ranging from the onset of inelastic response to complete structural collapse. The response of each structure was quantified in terms of a functional relationship between the ground motion intensity (PGA) and the key limit states of the structure (e.g., first yield, buckling, ultimate strength of anchor bolts, instability, etc.). The damage ratio associated with each limit state was derived in accordance with ATC-13 guidelines.

Figure 134 shows pushover analysis results for an open-frame plant structure being displaced in two orthogonal directions. As the figure indicates, under the action of transverse lateral loads, the first limit state is the buckling of a knee brace (shown by the red dot in the left figure in the top panel), and is associated with a sharp drop in the lateral strength. As the lateral load increases, an additional brace buckles resulting in another drop in the lateral strength.

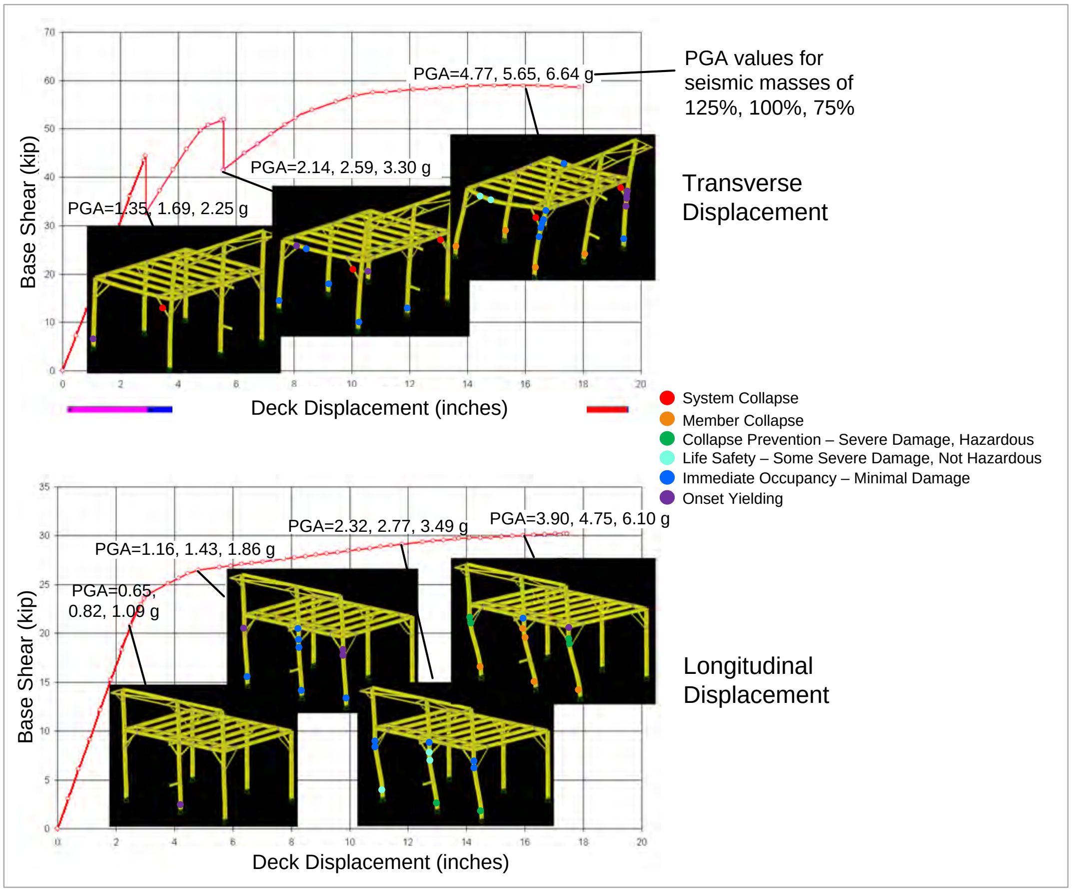

Figure 134. Pushover Analysis Results for an Open-Frame Structure showing PGA Values at Several Limit States

Additional stress in the legs and braces results in more deformation and eventual collapse. With increasing lateral loads in the longitudinal direction, the first plastic hinge forms at the base of a leg, followed by more plastic hinges at the leg bases and braces.

Each engineering analysis takes into account three different loading conditions: light, moderate, and heavy. This is done to take into account the variability in the live load, which affects the performance of structures in earthquakes. The transverse displacement has three limit states while the longitudinal displacement shows four limit states. These correspond to live loads (seismic loads) equal to 75%, 100%, and 125%, respectively, of the dead load of the structure itself. The dead load includes the self-weight of the structure and appurtenances, plus any equipment that it supports. The three PGA values close to each illustration represent the average ground motion level that brings that structure to the specified level of deformation, for each of the three loading conditions.

With a lighter load, a higher level of PGA is needed to bring the structure to the onset of a specific limit state. For example, at the first longitudinal displacement, a PGA value of 0.65 g is needed to bring this open frame structure with heavy load conditions (i.e., live loads equal to 125% of dead load) to the onset of minor damage. However with moderate loading on the same structure, a higher PGA (0.82 g) is needed, on average, to reach the same level of damage.

The following two figures show damage functions for open-frame structures with different load conditions derived from pushover analysis. Figure 135 shows the damage functions for an open-frame steel plant structure. Figure 136 shows the damage functions for an open-frame steel dock, which has a narrow frame supporting pipes and equipment.

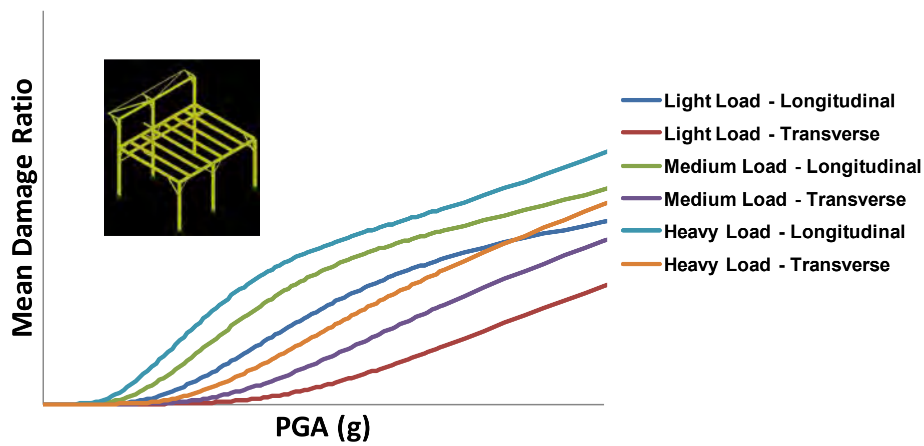

Figure 135. Damage Functions for an Open-Frame Steel Plant Structure

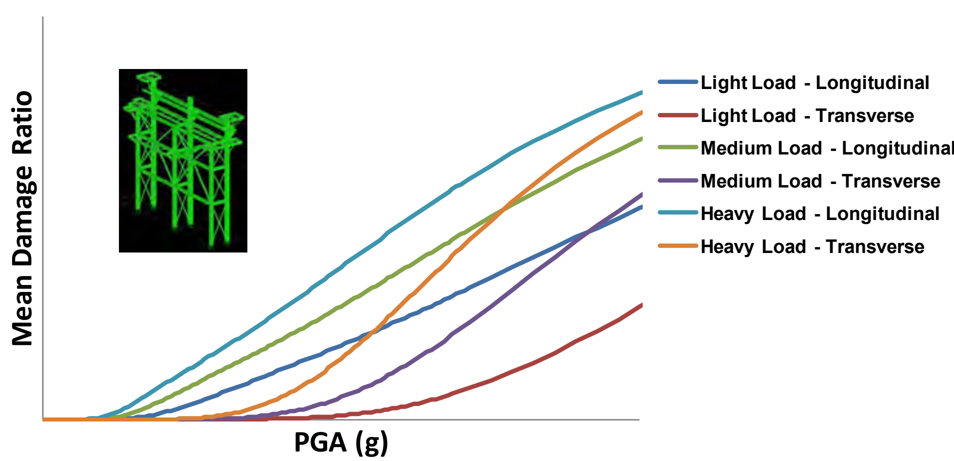

Figure 136. Damage Functions for an Open-Frame Steel Dock Structure

Developing Damage Functions for an Entire Industrial Facility

To develop damage functions at the facility level, AIR adopted an approach similar to that used to develop damage functions for buildings within an industrial facility. For each type of industrial facility, the aggregated damage functions were developed based on the damage functions for the component classes (e.g., tanks) and subcomponent classes (e.g., fully anchored tanks). The damage functions for each component and subcomponent were assigned a weight equal to the ratio between the replacement value of the class to the replacement value of the industrial facility.

The weights for different industrial facilities was derived from three major sources: studies performed by AIR for private industrial corporations (e.g., petrochemical and chemical facilities); ATC-13 1985 (for industrial classes such as heavy and light fabrication and assembly, food and drug, chemicals, metals, high technology, construction, and mining); and HAZUS (hydro- and thermo-power systems, potable and waste water, and gas processing plants). Each source provided, for each seismic region, a distribution of components for each type of facility.

Based on consulting studies, AIR made some reasonable assumptions about the typical characteristics and weight of individual sub-components in an industrial facility to develop the damage functions for different components. For example, AIR assumed different percentages of anchored and unanchored tanks; and tanks with different filling levels and aspect ratios within a facility.

Figure 137 and Figure 138 show damage functions for an oil refinery in California with anchored and unanchored components. The figures show the weighting factors for each component and subcomponent class, which are based on data from oil refineries. For both cases, the facility-level damage function, shown with the thick red line, is a weighted average of the damage functions of individual components.

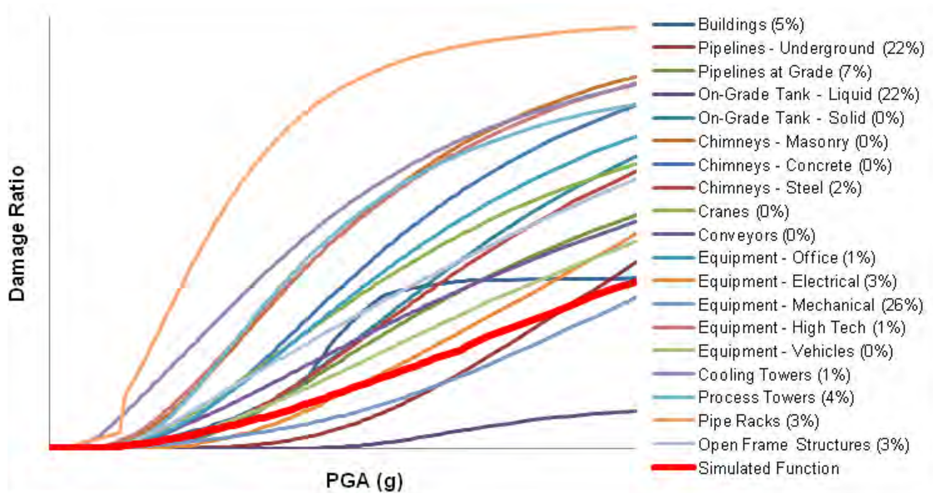

Figure 137. Damage Functions for an "Anchored" Oil Refinery in California

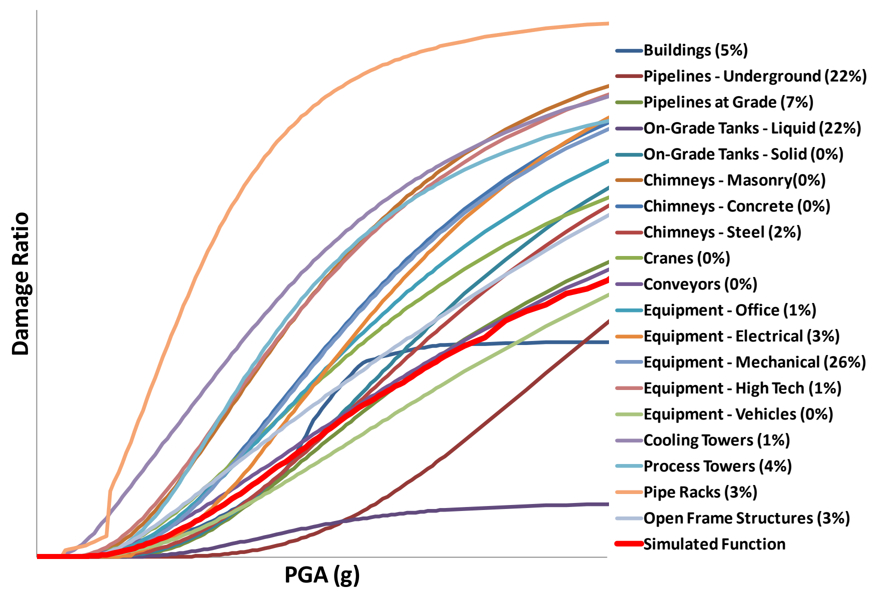

Figure 138. Damage Functions for Unanchored Oil Refinery in California

Customized Composite Damage Functions for a Particular Industrial Facility

As shown above, a plant-level damage function, such as one developed for an oil refinery, uses generalized information for each type of industrial facility (for the 400-level series). For example, the damage functions assume standardized equipment based on that which is commonly found in an industrial plant. Based on this information, estimations are made concerning the replacement values of those components, and their secondary characteristics (e.g., anchorage type, fill-level of tanks, construction type, etc.).

However the components in each facility vary widely, making each facility unique and sometimes too complex to be accurately captured within a generalized damage function. For example, only a fraction of the components may be anchored, and that fraction varies between facilities. Similarly, the percentage of a particular component can vary widely, creating a wide discrepancy in the replacement value.

To allow for wide variances between industrial facilities, AIR provides flexibility to CLASIC/2 users when applying industrial facility damage functions. Users can customize individual components to change their anchorage, enter their percentage, and make other customizations as needed. Clients can also select any combination of components and sub-components, and enter the relative weights for each. The model will generate customized composite damage functions on the fly using the client's input to match any particular industrial facility.

Developing Damage Functions for Different Regions of the United States and for Unknown Facility Types

To develop damage functions for industrial facilities across the country, AIR engineers studied the differences in the design base shear of components for each of the three major seismic areas: California, Washington and Oregon, and all other states. The values of PGA that induce, on average, the onset of a limit state on the same type of structure (e.g., an open frame structure) in different regions were evaluated by considering the different design base shears.

For unknown facility types, the damage functions for different regions are obtained by performing the same weighted averaging of the damage functions for different industrial facility types in each area. Figure 139 shows the weights used for each type of industrial facility, for each of the three main seismic regions of the United States.

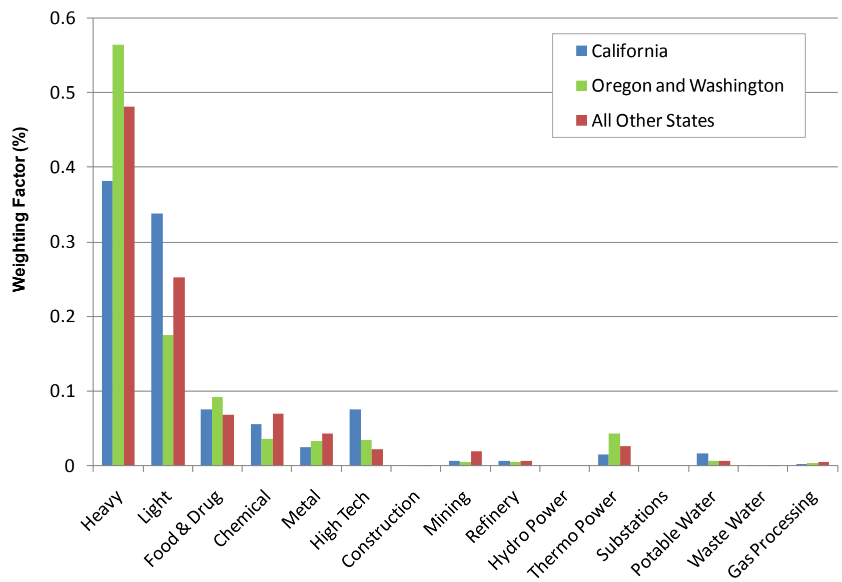

Figure 139. Distribution of Industrial Facility Types for each Seismic Area of the United States

Figure 140, Figure 141, and Figure 142 show the relativity of damage functions for each industrial facility type along with the damage function for an Unknown type of industrial facility, for each of the three seismic areas of the United States. In all three regions, the Unknown facility type (represented by the thick red line) represents a weighted average of the damage functions for the different known industrial facility types.

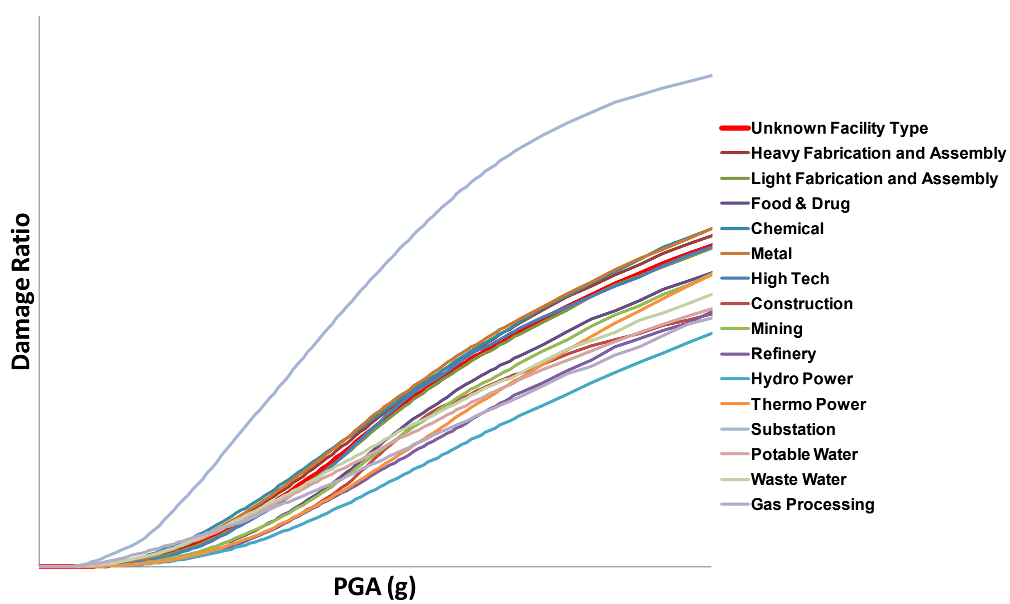

Figure 140. Damage Functions for Industrial Facilities in California

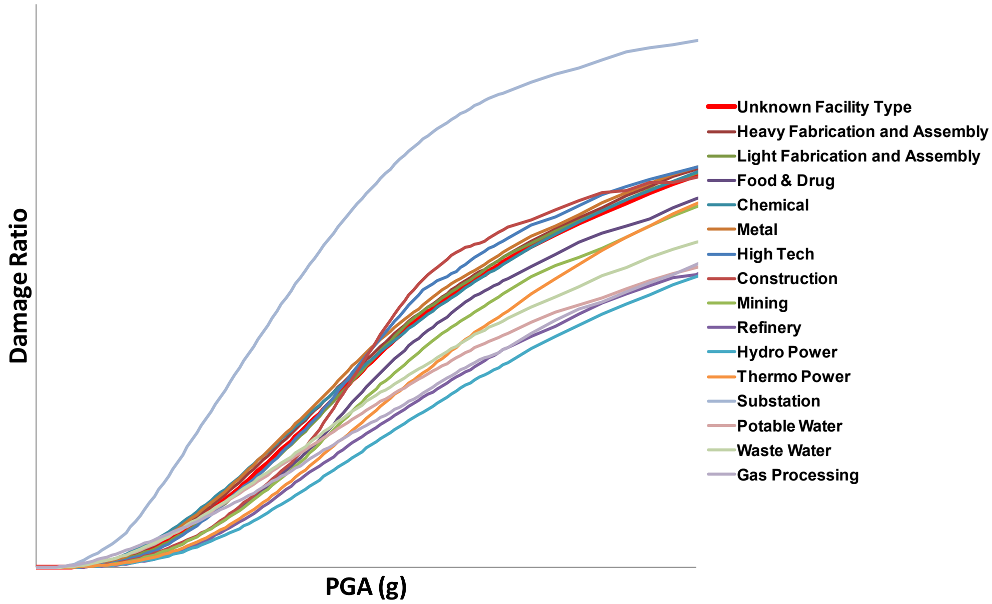

Figure 141. Damage Functions for Industrial Facilities in Oregon and Washington

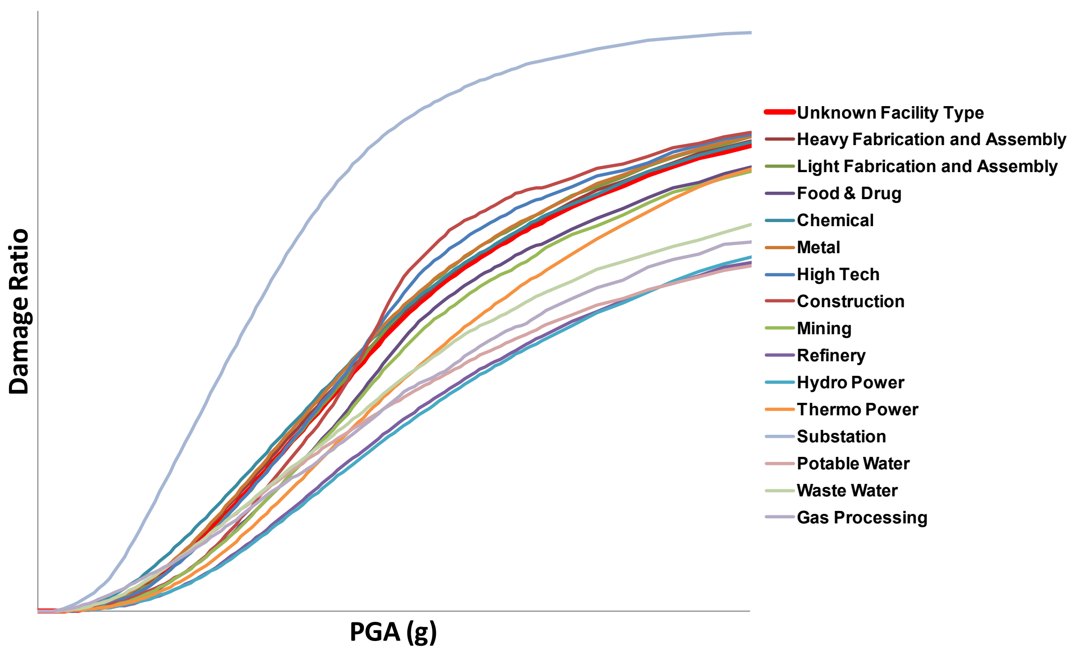

Figure 142. Damage Functions for Industrial Facilities for All States Outside of California, Oregon, and Washington

6.1 Assessment of Business Interruption Losses for Industrial Facilities

Assessing business interruption (BI) loss for industrial facilities is an extremely complex task, particularly in the case of highly integrated facilities with multiple process chains, bottlenecks, and redundancies. The major contribution to BI losses is the loss of revenues incurred when product chains are not functional (either partially or completely). Loss of functionality can occur as a result of physical damage to components and lifelines, such as electricity, water, steam systems, and others.

AIR's approach for the assessment of BI losses for these complex risks is the same as that used for other business lines. Because industrial facilities generally consist of a large number of components, AIR again uses a component-based approach. To assess the possible downtime of an entire industrial facility, AIR starts by determining time element damage functions for each component.

For each component, the time needed for repair or replacement, if necessary, is estimated. As in any other business interruption assessment, the time before repairs can get underway (pre-repair) is determined and added to the time needed for the actual repair. The information on the pre-repair and actual repair time for different components is based both on historical data and on the experience gained by AIR's engineers by consulting with the operators and managers of industrial facilities. In addition, the model takes into account components that are still operable or even undamaged, and therefore have no downtime at all. Once the time element functions are determined for all the components, the model aggregates the functions by determining a weighted average of the component functions—a process similar to that adopted for developing facility level property damage functions.

Figure 143 illustrates downtime functions for industrial facility components of unknown subclass (e.g., type of anchorage, level of liquid fill, type of material, etc.) in California.

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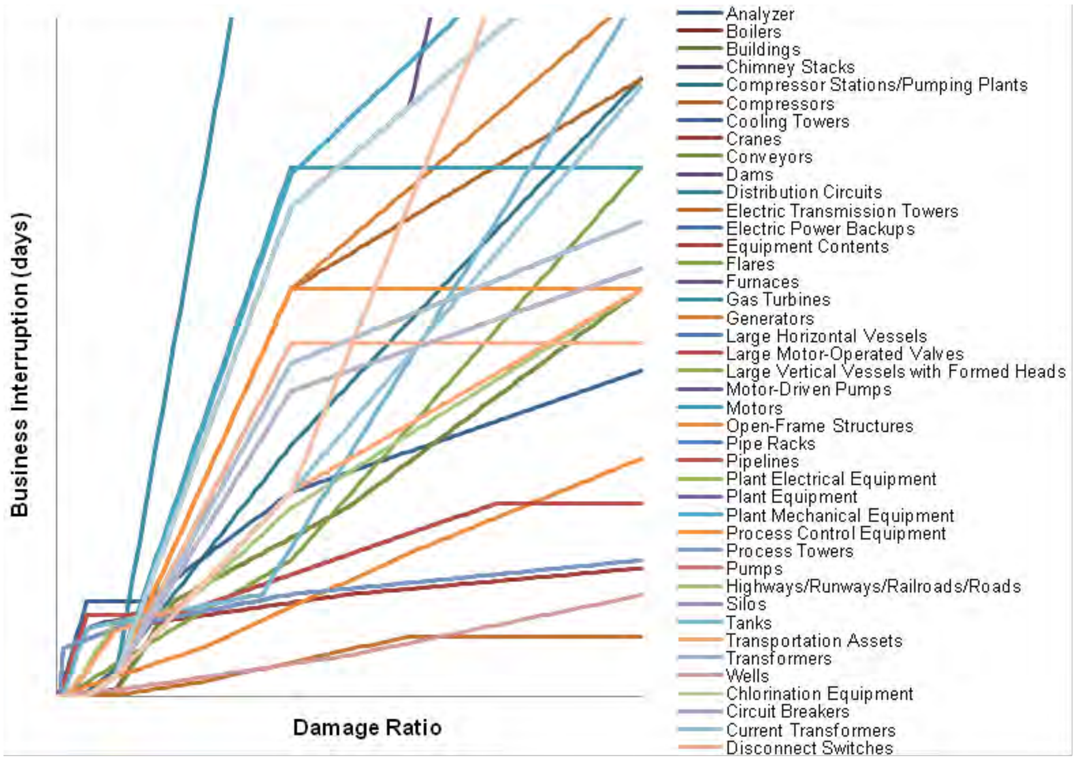

Figure 143. Time Element Functions for Industrial Facility Components

As described above, the business interruption (BI) functions at the facility level are the weighted average downtime functions of the individual component and sub-component class. Figure 144 shows the BI functions for facilities in California. The BI function for the Unknown industrial facility type, represented by the thick red line, is an industry-exposure weighted average of those of all facilities.

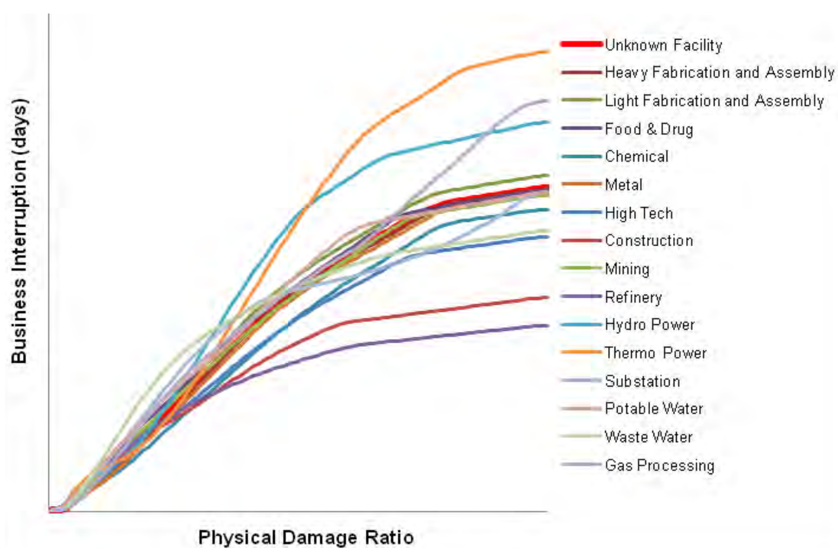

Figure 144. Time Element Functions for Industrial Facilities in California

6.2 Validating Damage Functions for Industrial Facilities

To validate the damage functions (at both the component and facility level), observational damage data to industrial facilities was collected from damage reconnaissance reports after historical earthquakes.

Table 21 lists 40 historical earthquakes from which damage data was collected for validating the damage functions for industrial facilities.

Table 21. Historical Earthquakes used for Facility and Component Damage Function Validation

Earthquake	Year	Earthquake	Year
Gediz, Turkey	1970	Dinar, Turkey	1995
San Fernando, California	1971	(Hyogo-Ken Nanbu) Kobe, Japan	1995
Imperial Valley, California	1979	Lijiang, Yunnan Province, China	1996
Borah Peak, Idaho	1983	Adana-Cayhan, Turkey	1998
Coalinga, California	1983	El Quindio, Colombia	1999
Morgan Hill, California	1984	Chichi (Jiji), Taiwan	1999
Chile	1985	Kocaeli, Turkey	1999
Michoacan, Mexico	1985	Duzce, Turkey	1999
San Salvador, El Salvador	1986	Nisqually, Washington	2001
Palm Springs, California	1987	Bhuj, India	2001
Whittier Narrows, California	1987	Southern Peru	2001
Tejon Ranch, California	1988	Molise, Italy	2002
Armenia	1988	Denali, Alaska	2002
Loma Prieta, CA	1989	Boumerdes, Algeria	2003
Philippines	1990	San Simeon, CA	2003
Costa Rica	1991	Bam, Iran	2003
Erzincan, Turkey	1992	Tecoman, Mexico	2003
Hokkaido-Nansei-Oki, Japan	1993	Nigata Ken Chuetsu, Japan	2004
Guam	1993	Sumatra, Indonesia	2004
Northridge, CA	1994	Hawaii	2006

Some types of industrial facilities and components, whose damage functions have been validated using damage data from historical earthquakes, are listed in Table 19.

Table 22. Some Facilities and Components Validated with Damage Data from Historical Earthquakes

Facility	Earthquake	Year
Chemical Plants	Borah Peak, ID	1983
	Coalinga, CA	1983
	Morgan Hill, CA	1984
	Chile	1985
	Hokkaido Nansei-Oki, Japan	1993
	Izmit, Turkey	1999
	Athens, Greece	1999
	Bam, Iran	2003
Thermo-Power Plants	San Fernando, CA	1971
	Imperial Valley, CA	1979
	Chile	1985
	Loma Prieta, CA	1989
	Northridge, CA	1994
	Kobe, Japan	1995
	Chichi (Jiji), Taiwan	1999
	Izmit, Turkey	1999
	Athens, Greece	1999
	Southern Peru	2001
	San Simeon, CA	2003
	Sumatra, Indonesia	2005
	Hawaii	2006
Metal Processing Plants	Chile	1985
	Kobe, Japan	1995
	Izmit, Turkey	1999
	San Simeon, CA	2003
Potable Water Systems	Imperial Valley, CA	1979
	Coalinga, CA	1983
	Northridge, CA	1994
	Kobe, Japan	1995
	Central Colombia	1999
	Chichi (Jiji), Taiwan	1999
	Nisqually, WA	2001
	Southern Peru	2001
	Bam, Iran	2003
	San Simeon, CA	2003
Pipes	Imperial Valley, CA	1979
	Coalinga, CA	1983
	Morgan Hill, CA	1984
	Chile	1985
	Loma Prieta	1989

Poles	San Fernando, CA	1971
	Imperial Valley, CA	1979
	Whittier Narrows, CA	1987
	Northridge, CA	1994
	Kobe, Japan	1995
	Chichi (Jiji), Taiwan	1999
Pipe Racks	Loma Prieta, CA	1989

Figure 145, Figure 146 and Figure 147 show facility-level damage functions plotted against observational data from some historical earthquakes.

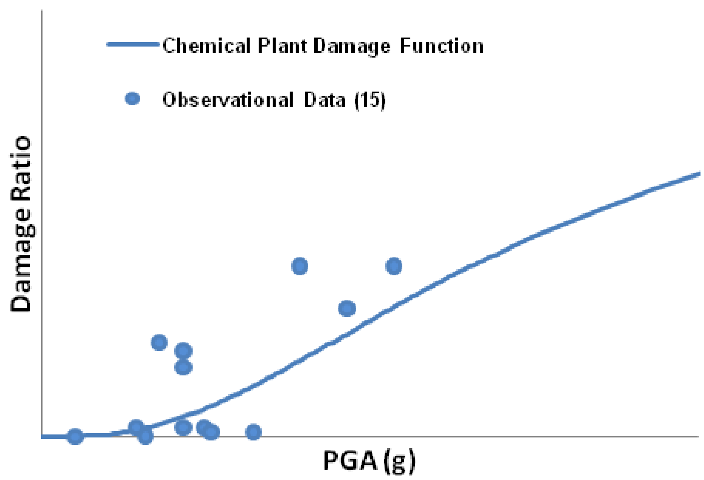

Figure 145. Damage Functions and Observed Damage Data for Chemical Processing Plants in a High Seismicity Area

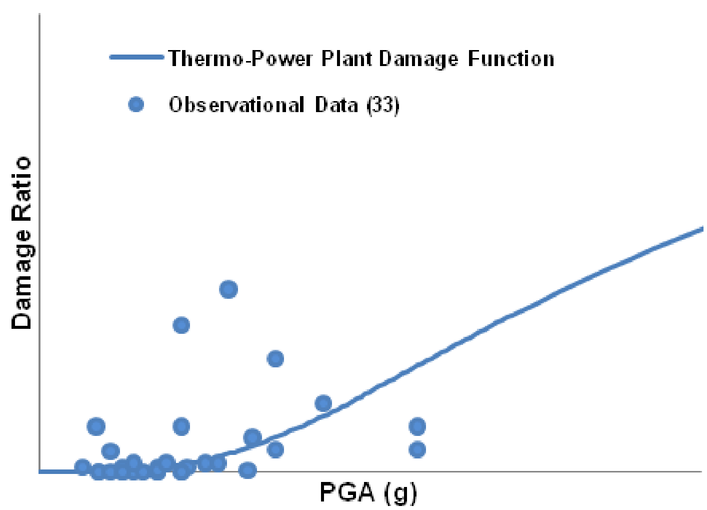

Figure 146. Damage Functions and Observed Damage Data for a Thermo-Power Plant in a High Seismicity Area

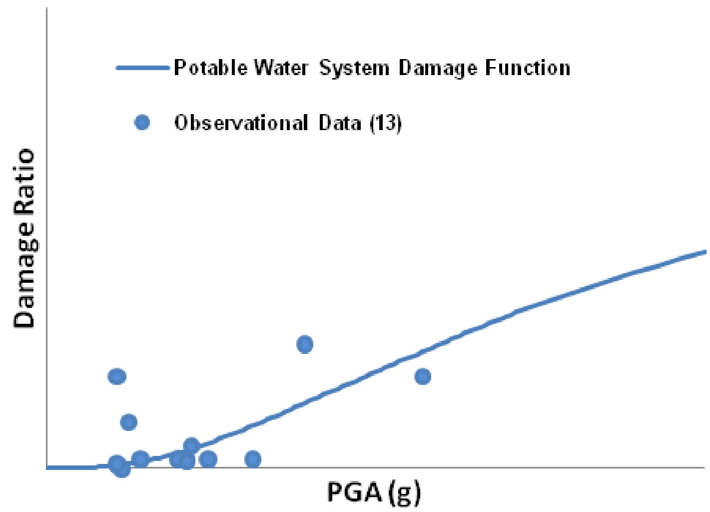

Figure 147. Damage Functions and Observed Damage Data for Potable Water Systems in a High Seismicity Area

7 Insured Loss Calculation

The AIR Earthquake Model for the United States uses a comprehensive cost model to estimate the repair cost of each damaged component in order to translate ground-up damage into monetary losses. Insured losses are calculated by applying policy conditions to the total damage estimates resulting from the damage estimate module. A wide variety of policy conditions are supported in this model, including franchise deductibles, coverage limits, loss triggers and risk-specific reinsurance terms.

7.1 Aggregating Losses Probabilistically

Post-disaster surveys and actual claims data reveal an inherent variability in damage to buildings caused by ground motion. The loss estimates that are generated by the AIR Earthquake Model for the United States capture this variability by accounting for both primary and secondary uncertainty. Primary uncertainty is associated with the randomness in the location and size of future events, which is captured in the stochastic catalog event-generation process. Secondary uncertainty is the uncertainty in the damage of a building resulting from a given earthquake; it includes both the uncertainty in the damage given a level of ground motion at the site and the uncertainty in the actual ground motion experienced at the site. The uncertainty in building damage for a given level of ground motion is due to the variability of the response of buildings of similar construction to a given intensity, and is controlled by the variability in the characteristics, construction materials, workmanship, etc. of buildings of the same construction class. The uncertainty in ground motion generated at a given site by an earthquake of given characteristics, which is included in ground-motion prediction equations with an intra-event variability term, has been considered explicitly in the model.

As was discussed in Section 5, losses are calculated by damage functions that provide, for a given mean ground-motion level, a mean damage ratio (MDR) and a measure of the variability of the damage around the mean which is modeled via a probability distribution. As discussed before, the AIR Earthquake Model for the United States uses integrated damage functions in order to take into account variations in the MDR due to the intra-event variability in ground-motion intensity. The inter-event variability of the ground motion intensity at a site generated by different events with similar parameters (e.g., magnitude) has also been considered. The uncertainty around the mean damage for a given intensity level is modeled as a mixed probability distribution. The damage ratios between

0% and 100% are modeled as a continuous random variable that follows a beta distribution while the important cases of exactly zero damage and complete collapse are modeled with a discrete random variable with finite probability masses at 0% and 100% damage ratios.

The damage functions are used to produce, for each event, a distribution of ground-up loss by location and coverage. Limits, deductibles and reinsurance are applied in the financial module to the ground-up loss distribution to produce gross and net loss estimates. Note that insured losses can accumulate even if the *mean* damage ratio is below the deductible, because some structures are damaged above the mean and the deductible. The distributions are applicable to the analysis of a single exposure and usually have a high degree of uncertainty. The individual distributions are combined to obtain the portfolio distribution, where the uncertainty is lower.

In the financial module, there is clearly a need to aggregate losses probabilistically, at various levels. Specifically, computational techniques are developed for statistically aggregating nonparametric distributions. Even though the ground-up, coverage-level damage distributions typically use parametric distributions, once location and policy terms are applied the distributions cannot be represented parametrically. Further aggregation of such loss distributions are achieved using numerical algorithms.

AIR's software applications include a financial module that allows a wide variety of location, policy, and reinsurance conditions to be applied to a calculation. Location terms may be specified to include limits and deductibles by site or by coverage. Supported policy terms include blanket and excess layers, minimum and maximum deductibles, and sublimits.

Reinsurance terms include facultative certificates and various types of risk-specific and aggregate treaties with occurrence and aggregate limits. Please see product specific documentation available from the client support section of AIR's website (www.air-worldwide.com) as well as details on the industry standard UNICEDE data format (www.unicede.com) for additional information.

7.2 Validating Modeled Losses

The AIR Earthquake Model for the United States has been calibrated for physical damage and monetary losses using USGS ShakeMap, building performance data, post-event damage observation data, and detailed claims data from several insurance companies. Modeled losses have also been validated using the ground-up loss data from events dating as far back as 1900, as reported by several research papers and insurance industry organizations.

Figure 148 compares AIR modeled losses to reported losses for three historical events. It should be noted that for the 1906 San Francisco earthquake, actual loss data is not available. However, even if it were available, it would have little meaning today. The estimated figure (with uncertainty, as depicted by the vertical line) shown in Figure 148, represents published estimates from a variety of researchers.

Note, too, that the estimates and comparisons in Figure 148 are based on ground-up damage on an industrywide portfolio and they have all been normalized to 2008 values. The deductibles and policy conditions for earthquakes have changed over time, as have the take-up rates. Therefore, performing such a comparison on an insured or an industry insurable basis is very challenging.

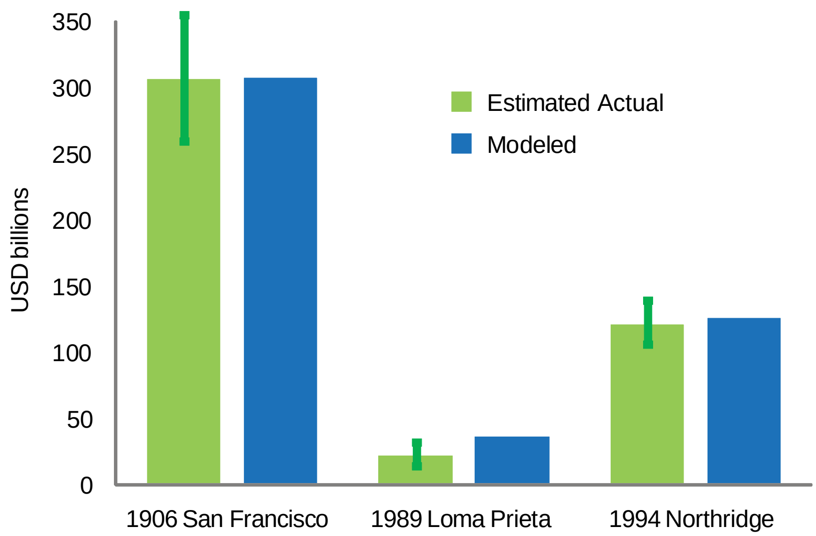

Figure 148. Comparison between Actual and Modeled Losses for Key Historical Events (variation in published reported losses is represented by an error bar)

Figure 149 shows a similar set of exhibits for less severe events. It is important that the model perform well not only for medium-to-high severity events, but also for low-severity events, which have a significant impact on the high-frequency portion of the exceedance probability curve and on average annual losses. Note again that there is considerable uncertainty in the reported losses for the older events.

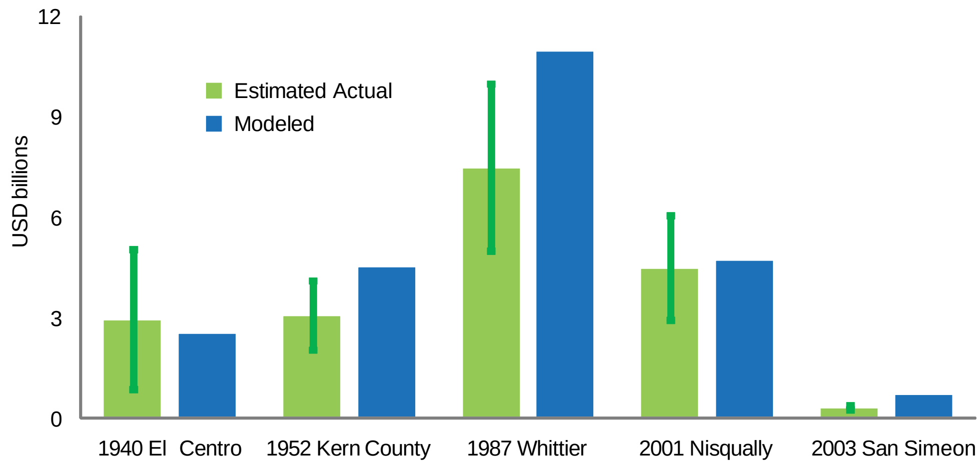

Figure 149. Comparison between Actual and Modeled Losses for Less Severe Historical Events (variation in published reported losses is represented by an error bar)

Validating the Distribution of Losses by Coverage

For the Northridge earthquake, we can show the relative distribution of losses between Building, Contents, and Business Interruption. Figure 150 compares the modeled loss distribution to reported loss data from the Institute for Building and Home Safety (1998). As can be seen in the figure, the two distributions compare favorably.

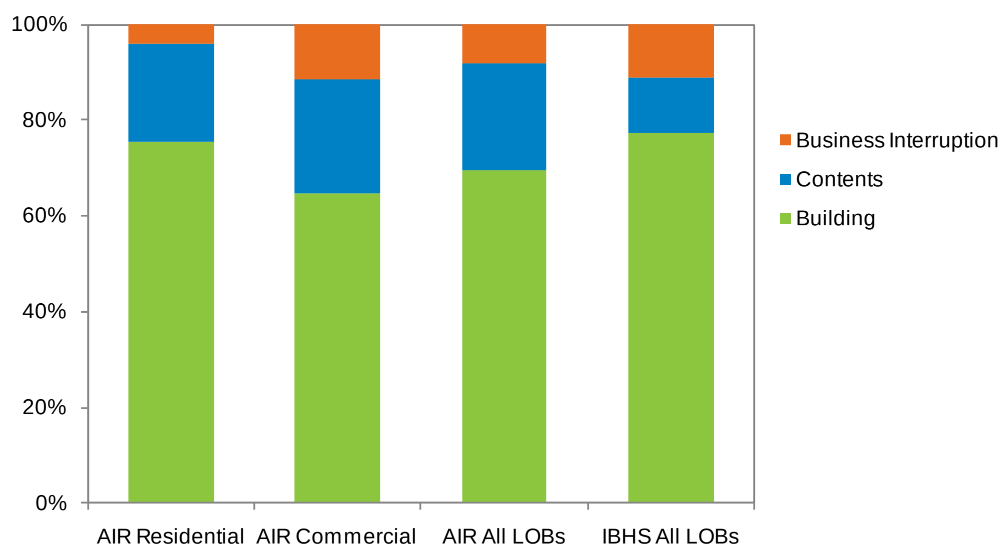

Figure 150. Relative Distribution of Modeled vs. Reported Insurable Losses, 1994 Northridge Earthquake

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9 About AIR Worldwide

AIR Worldwide (AIR) is the scientific leader and most respected provider of risk modeling software and consulting services. AIR founded the catastrophe modeling industry in 1987 and today models the risk from natural catastrophes and terrorism in more than 90 countries. More than 400 insurance, reinsurance, financial, corporate, and government clients rely on AIR software and services for catastrophe risk management, insurance-linked securities, detailed site-specific wind and seismic engineering analyses, and agricultural risk management. AIR is a member of the Verisk Insurance Solutions group at Verisk Analytics (Nasdaq:VRSK) and is headquartered in Boston with additional offices in North America, Europe, and Asia. For more information, please visit www.air-worldwide.com.

Attract One

Description	Interval	Interval Points
Constant		0.41938275
# OF ACCOUNTS EVER 30 DAYS LATE OR WORSE	0 1 2 or more bypass no accts	0.00000000 0.03710475 0.05445702 0.00000000 0.05445702
AVERAGE # OF/MONTHS ACCTS HAVE BEEN OPEN	0 - 17 18 - 26 27 - 38 39 - 77 78 - 118 119 - 129 130 - 146 147 or more	0.00000000 -0.01853491 -0.06557460 -0.08455045 -0.08939881 -0.09419093 -0.09992764 -0.10608044
# OF DEROGATORY PUBLIC RECORD ITEMS LESS MEDICAL COLLECTIONS	1 2 or more no public recs	0.05758274 0.10445912 0.00000000
# OF ACCOUNTS ON FILE	1 - 6 7 - 14 15 - 17 18 - 22 23 - 30 31 or more collection accts only	0.00000000 0.02530460 0.02550220 0.05115582 0.06718021 0.07807018 0.06718021
# OF BANK REVOLVING ACCOUNTS PAID SATISFACTORY IN THE LAST 24 MONTHS	0 1 - 4 5 or more	0.00000000 -0.00694762 -0.03286667
# OF CONSUMER INITIATED INQUIRIES IN THE LAST 6 MONTHS EXCLUDING INSURANCE INQUIRIES AUTO & MORTGAGE ARE DE-DUPED WITHIN 30 DAYS	0 1 2 3 - 4 5 - 6 7 or more	0.00000000 0.00624916 0.02263173 0.02450539 0.05516139 0.07783899
TOTAL AVERAGE DEBT BURDEN (TOTAL BALANCE/TOTAL HIGH CREDIT)	0.0000 - 0.0116 0.0117 - 0.0480 0.0481 - 0.4046 0.4047 - 0.7254 0.7255 or more bypass/no accts	0.00000000 -0.00668316 0.01124870 0.02229914 0.02712739 0.02712739
# OF ACCOUNTS ALWAYS PAID SATISFACTORY	0 - 1 2 3 4 5 - 8 9 - 14 15 or more	0.00000000 -0.00616366 -0.02320315 -0.02736071 -0.03674721 -0.01718164 0.00000000
AMOUNT OF PAST DUE BALANCES / TOTAL BALANCES	0 0.0001 - 0.0258 0.0259 or more	0.00000000 0.00587737 0.03218474
# OF OPEN BANK INSTALLMENT ACCOUNTS	0 - 1 2 or more bypass/no bank install	0.00000000 0.02979519 -0.00919318
# OF OPEN RETAIL ACCOUNTS	0 1 2 3 or more	0.00000000 0.01518899 0.02551045 0.02867840
NO AUTO FINANCE ACCOUNTS ESTABLISHED	auto finance accts no auto finance	0.00000000 -0.02217035

Attract One

Description	Interval	Interval Points
% OF ACCOUNTS PAID SATISFACTORY TO TOTAL ACCOUNTS ON FILE	0.0000 - 0.7143 0.7144 or more	0.00000000 -0.01724891
AGE OF OLDEST BANK REVOLVING ACCOUNT (IN MONTHS)	0 1 - 23 24 - 56 57 - 98 99 - 140 141 or more	0.00000000 -0.00497433 -0.02070378 -0.02129159 -0.03797212 -0.04634066
# OF BANK REVOLVING ACCOUNTS WITH BALANCE TO HIGH CREDIT 75% OR MORE	0 1 2 3 or more	0.00000000 0.00822224 0.00883561 0.02432363
# OF RETAIL ACCOUNTS EVER 60 DAYS LATE	0 1 or more	0.00000000 0.03896582
AGE OF YOUNGEST ACCOUNT (IN MONTHS)	0 - 12 13 or more	0.00000000 -0.01990612
FILE CONTAINS CREDIT UNION, S&L, MORTGAGE ACCOUNTS PAID SATISFACTORY, 30 DAYS, 60 DAYS, 90-120 DAYS LATE AND BAD DEBT	NO YES	0.00000000 0.49406772
FILE CONTAINS BANK INSTALLMENT ACCOUNTS PAID SATISFACTORY, 30 DAYS AND 60 DAYS LATE	NO YES	0.00000000 0.06031028

Attract One

Raw Score = Intercept + Sum of points assigned for all variables

Final Score *	**=** -1433.53633565 * (Raw Score - 0.12222861) + 997	if (Raw Score) <= 0.24011889
	= -1418.90777099 * (Raw Score - 0.24011890) + 827	else if (Raw Score) <= 0.27042390
	= -1158.20609568 * (Raw Score - 0.27042391) + 783	else if (Raw Score) <= 0.29718944
	= -1007.35094984 * (Raw Score - 0.29718945) + 751	else if (Raw Score) <= 0.32299972
	= -928.12772275 * (Raw Score - 0.32299973) + 724	else if (Raw Score) <= 0.34885824
	= -915.72366207 * (Raw Score - 0.34885825) + 699	else if (Raw Score) <= 0.37506703
	= -915.69254003 * (Raw Score - 0.37506704) + 674	else if (Raw Score) <= 0.40346085
	= -895.18767321 * (Raw Score - 0.40346086) + 647	else if (Raw Score) <= 0.43809047
	= -836.62910072 * (Raw Score - 0.43809048) + 615	else if (Raw Score) <= 0.48948721
	= -507.13943325 * (Raw Score - 0.48948722) + 571	else if (Raw Score) >= 0.48948722

***** (1) Round off Final Score to the nearest integer value
(2) Set (Final Score) = 200 if (Final Score) < 200
(3) Set (Final Score) = 997 if (Final Score) > 997

Attract One Score

Table of Contents

Attract One

The Attract One score uses information in credit reports to produce a score that indicates the relative rank ordering of applicants and policyholders by claim frequency and/or loss ratio. Attract One was developed using statistical regression modeling techniques. This method finds the most predictive combination of credit characteristics. The characteristics are weighted based on their significance in predicting loss ratio propensity. The weights assigned are tallied resulting in a final score. Scores delivered on an individual range from 200 to 997 with higher scores indicating better risks.

Credit Characteristic Groups

The credit characteristics evaluated in the development of the Attract One model cover three main areas of the credit report:

Adverse Public Records: These include Bankruptcy, Lien, Garnishment and Judgement. Also included in this group are items reported by Collection Agencies. Collections that can be identified as medical related are excluded.

Account Information: This group includes the number of accounts (often referred to as trades), payment history, financial information such as amount of leverage, and how long accounts have been established. Characteristics that are specific to certain industry types such as bank revolving accounts, bank installment, department store, auto finance, personal finance, credit union, savings & loan, mortgage and oil company card accounts.

Inquiries: These are inquiries initiated by the consumer when the consumer is actively seeking to obtain credit. Inquiries made as a result of an auto loan or mortgage loan are only counted as one when reported within a 30 day timeframe. Inquiries made by insurance companies are excluded. This does not include inquiries that are a result of a promotional credit solicitation, account review or account monitoring or when the consumer request his or her own credit report.

Types of Credit Characteristics Analyzed in Development

- Payment History
  - Has a bankruptcy been filed?
  - Are there any adverse public records?
  - Are there any collections?
  - Were payments made on time?

- Financial Information
  - Balances on accounts
  - High credit/credit limits on accounts
  - Degree of utilization (balance/credit limit)

- Types of Credit

- Bank Revolving	Primarily Visa, MasterCard, Discover type credit cards
- Bank Installment	Installment loans made by banks (fixed # of months to pay back)
- Department Stores	Primarily major department stores such as Penney's, Sears, etc.
- Consumer Finance	Sales finance such as large ticket items (furniture, stereos, TVs, etc.)
- Personal Finance	Primarily creditors that are a more expensive source to obtain credit such as Household Finance, Beneficial, etc.
- Retail	Clothing stores (Limited, Structure, etc.), jewelers, home furnishings, mail order and variety stores
- Automotive	Tires, parts, service stations, new and used car lots, truck and farm equipment dealers
- Auto Finance	Finance or lease of a car primarily through a major car manufacturer such as GMAC, Ford Motor Credit, etc.
- Credit Union	Account established with a credit union. This category also includes savings and loan and mortgage company accounts
- Oil Company	Gas cards such as Amoco, BP, etc.

- Age of Credit File
  - Age of oldest account
  - Age of youngest account
  - Average number of months since account opened

- Inquiry Activity
  - Number of inquiries in the last 6 months
  - Number of inquiries with finance companies in the last 24 months
  - Number of months since most recent inquiry

The Attract models do not consider race, gender, ethnicity, age, religion, income, marital status or residency.

Extraordinary Life Events

It is not systematically possible for the Attract model to identify items contained in a credit report that may be affected due to extraordinary life events such as natural catastrophes, catastrophic illness, loss of employment or divorce. Since the score cannot account for such circumstances, each carrier will need to develop standards and procedures for addressing same. Items identified as being in a dispute status will be excluded from scoring as required.

No Hits and No Scores

There are some transactions where a score cannot be calculated either because a credit file could not be found (no-hit) or the credit information is too limited to produce a score (no-score). Attract will not calculate a score unless the credit file contains at least one consumer initiated inquiry or one account that has been reported to the credit bureau in the last 24 months. In addition a file that contains only consumer initiated inquiries will not be scored.

A study performed by the Bureau for Business Research indicates that no-hits and no-scores perform 7% worse than the average. Another study performed by EPIC Actuaries found similar results.

Score Reason Codes and Meanings

In addition to generating the score value, the model also returns up to four "reason codes" which show the credit characteristics that had the most impact in reducing someone's score. A list of these reason codes can be found in the following section . Additional explanations of these messages are provided in a separate document.

Attract One Score Reason Codes and Corresponding Meanings

Code	Meaning
0101	Number of Derogatory Public Record Items
0102	# of Inquiries for Transactions Initiated by Consumer in Last 6 Months
0103	Length of Time Accounts Have Been Established
0104	Length of Time Since Newest Account was Established
0108	Number of Open Installment Bank Accounts
0110	Number of Open Retail Accounts
0126	Percent of Accounts Reported in Last 24 Months to Total Accounts on File
0133	Length of Time Bank Revolving Accounts have been Established
0141	Number of Collection Agency Filings
0161	Number of Accounts that have been Established
0170	Percent of Balance to Credit Limit on Open Accounts
0176	Number of Auto Finance Accounts Established
0177	Number of Accounts Currently or in the Past w/30+ Day Late Payments
0231	Ratio of Total Amount of Past Due Balances to Total Balances on Accounts
0232	# of Bank Installment Accounts with Current or Previous Late Payments
0233	# of Open Bank Revolving Accts w/ Balance to Credit Limit 75% or More
0234	# of Bank Revolving Accts Paid as Agreed in the Last 24 Months
0235	# of Credit Union, S&L, Mortgage Accts w/ Current or Previous Late Pays
0236	# of Retail Accounts with Currently or Previous 60 Day Late Payments
0237	Number of Accounts Always Paid as Agreed

Attract One was developed for both auto and property policies. The development database was comprised of hundreds of thousands of policy records pooled from many insurers, including premium and claims data. Historical credit characteristics were matched to the policy records, and scores were developed to rank- order the loss ratio risk of policy groups.

Model Validation

The table below demonstrates the degree to which the Attract One model is able to separate loss ratio performance on auto policies and on homeowner policies.

AUTO:

Percentile	Score Range	Rel. Loss Ratio
91 - 100%	228 - 564	136
81 - 90%	565 - 601	127
71 - 80%	602 - 632	114
61 - 70%	633 - 657	112
51 - 60%	658 - 681	101
41 - 50%	682 - 705	95
31 - 40%	706 - 731	90
21 - 30%	732 - 762	82
11 - 20%	763 - 804	78
0 - 10%	805 - 984	67

HOME:

Percentile	Score Range	Rel. Loss Ratio
91 - 100%	236 - 567	183
81 - 90%	568 - 607	135
71 - 80%	608 - 638	115
61 - 70%	639 - 663	106
51 - 60%	664 - 687	95
41 - 50%	688 - 710	86
31 - 40%	711 - 734	87
21 - 30%	735 - 762	75
11 - 20%	763 - 801	69
0 - 10%	802 - 974	59

All credit factors included in the algorithms had P-Values less than .05 indicating high individual statistical significance, and many factors had P-Values less than .0001.

The Attract scores were developed using credit data obtained through Equifax. The models were also validated on Experian data.

RPI by Peril Model Details

Model Name	Response	Distribution	Link Function
Dwelling Fire	Fire Incurred Loss / Fire Earned House-Years	Tweedie	Log
Dwelling EC	EC Incurred Loss / EC Earned House-Years	Tweedie	Log
Dwelling Broad/Special	(Broad/Special Incurred Loss) / (Broad/Special Earned House-Years)	Tweedie	Log
Dwelling Earthquake	AIR Earthquake Modeled Loss / Earthquake Policies Inforce	Gamma	Log
Dwelling Fire Following EQ	AIR Fire Following EQ Modeled Loss / Fire Following EQ Policies Inforce	Gamma	Log
Condo Fire	Fire Incurred Loss / Fire Earned House-Years	Tweedie	Log
Condo EC	EC Incurred Loss / EC Earned House-Years	Tweedie	Log
Condo Broad/Special	(Broad/Special Incurred Loss) / (Broad/Special Earned House-Years)	Tweedie	Log
Condo Earthquake	AIR Earthquake Modeled Loss / Earthquake Policies Inforce	Gamma	Log
Condo Fire Following EQ	AIR Fire Following EQ Modeled Loss / Fire Following EQ Policies Inforce	Gamma	Log

USAA Group
Arkansas
Homeowners Insurance
Premiums and Losses by Insurance Credit Score

	2009		2010		2011		2012		2013	
Credit Score	Premiums	Losses	Premiums	Losses	Premiums	Losses	Premiums	Losses	Premiums	Losses
Unknown	$1,597,178	$14,810,411	$254,569	$1,070,434	$313,665	$440,092	$282,723	$71,195	$559,621	$86,988
500 or less	$25,291	$9,137	$30,166	$438,701	$18,292	$29,554	$22,563	$11,468	$36,523	$20,830
501 to 550	$382,025	$365,706	$501,331	$902,462	$559,804	$1,097,079	$668,972	$541,933	$786,873	$891,397
551 to 600	$1,217,531	$696,938	$1,569,176	$2,637,140	$1,709,100	$2,309,531	$2,211,233	$1,670,134	$2,570,625	$1,940,089
601 to 650	$2,116,744	$1,510,699	$2,737,540	$2,822,492	$3,167,602	$4,619,650	$3,914,575	$3,665,496	$4,570,489	$1,513,363
651 to 700	$2,992,526	$1,419,161	$3,971,180	$2,634,882	$4,793,001	$7,809,416	$6,038,422	$3,210,507	$7,024,911	$3,283,032
701 to 750	$3,127,388	$1,619,148	$4,210,811	$2,243,248	$5,179,282	$6,866,711	$6,131,616	$5,274,467	$7,308,257	$3,327,979
751 to 800	$1,767,702	$610,750	$2,412,608	$1,445,281	$3,157,843	$3,831,350	$4,007,092	$1,989,465	$4,908,327	$1,494,901
801 to 850	$1,192,371	$807,263	$1,600,031	$1,519,798	$2,192,730	$2,389,738	$2,837,658	$1,245,988	$3,614,752	$1,132,503
851 to 900	$757,070	$762,459	$974,811	$370,135	$1,370,301	$1,380,224	$1,759,227	$526,970	$2,318,895	$765,174
901 to 950	$288,649	$85,537	$390,937	$568,155	$561,387	$385,076	$664,185	$147,611	$912,364	$215,631
951 to 997	$30,991	$5,673	$38,046	$8,769	$42,325	$24,932	$51,869	$28,647	$54,149	-$7,609

USAA Group

Arkansas

Rental Property Insurance

Indicated and Selected Tier Point Contributions for Enterprise Collateral

Dwelling and Condos

	RPI		HO	
Enterprise Collateral	**Indicated**	**Selected**	**Indicated**	**Selected**
BANK+LIFE+IMCO	-1.4	-3	-1	-3
BANK+IMCO	-1.4	-2	0	-2
BANK+LIFE	-1.4	-2	-1	-2
IMCO+LIFE	-1.4	-2	-1	-2
BANK	0.0	-1	0	-1
IMCO	0.0	-1	0	-1
LIFE	0.0	-1	-1	-1
NONE	0.0	0	0	0

USAA Group
Arkansas
Rental Property Insurance
Coverage A and C Claims Activity Surcharge Factors
Dwelling and Condos

Prior Non-Weather	Fire (Non Catastrophe)			EC (Non Catastrophe)			Broad (Non Catastrophe)			Special (Non Catastrophe)		
		Homeowners			Homeowners			Homeowners			Homeowners	
Claims	Current	Indicated	Selected	Current	Indicated	Selected	Current	Indicated	Selected	Current	Indicated	Selected
0	n/a	1.0000	1.0000	n/a	1.0000	1.0000	n/a	1.0000	1.0000	n/a	1.0000	1.0000
1	n/a	1.1710	1.1710	n/a	1.1241	1.1241	n/a	1.2909	1.2909	n/a	1.2909	1.2909
2	n/a	1.5061	1.5061	n/a	1.3107	1.3107	n/a	1.6092	1.6092	n/a	1.6092	1.6092
3	n/a	1.9214	1.9214	n/a	1.5197	1.5197	n/a	1.9107	1.9107	n/a	1.9107	1.9107
4	n/a	2.3097	2.3097	n/a	1.8662	1.8662	n/a	2.2739	2.2739	n/a	2.2739	2.2739
for each add'l claim above 4 add:	n/a	0.2600	0.2600	n/a	0.5900	0.5900	n/a	0.3200	0.3200	n/a	0.3200	0.3200

Prior Non-Weather	Earthquake Shake			Liability / Medical Payments		
		Homeowners			Homeowners	
Claims	Current	Indicated	Selected	Current	Indicated	Selected
0	n/a	1.0000	1.0000	n/a	1.0000	1.0000
1	n/a	1.0000	1.0000	n/a	1.1823	1.1823
2	n/a	1.0000	1.0000	n/a	1.5643	1.5643
3	n/a	1.0000	1.0000	n/a	2.0502	2.0502
4	n/a	1.0000	1.0000	n/a	2.7561	2.7561
for each add'l claim above 4 add:	n/a	0.0000	0.0000	n/a	0.3000	0.3200

Dwelling Broad/Special
USAA Group
***Incorporated Variables**

Variable Description
Policy Year
State
Amount of Insurance
Deductible
Number of Families
Vacancy/Unoccupied Indicators
Home Age
Square Footage
PRL (Tier)

*These are the variables that were statistically significant in the model.

Dwelling EC
USAA Group
***Incorporated Variables**

Variable Description
Policy Year
State
Company
Amount of Insurance
Wind/Hail Deductible
Number of Families
Vacancy/Unoccupied Indicators
Home Age
Under Construction
Square Footage
Roof Type
PRL (Tier)

*These are the variables that were statistically significant in the model.

Dwelling Fire
USAA Group
***Incorporated Variables**

Variable Description
Policy Year
State
Rated Construction
Home Age
Protection Class
Square Footage
Sprinklers
PRL (Tier)

*These are the variables that were statistically significant in the model.

Dwelling Earthquake
USAA Group
***Incorporated Variables**

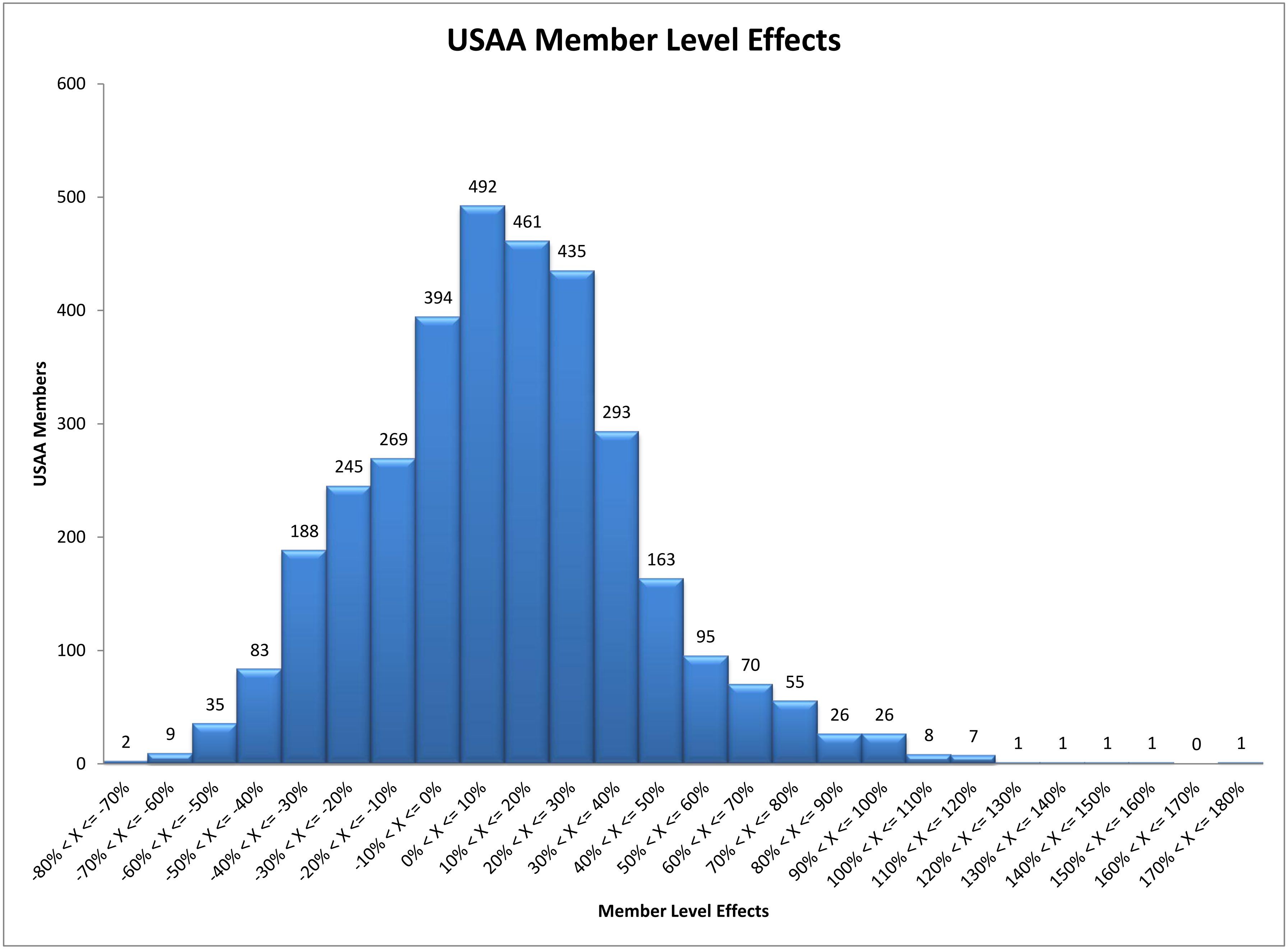
Variable Description
State
Earthquake Zone
Amount of Insurance
Cov B Percent
Rated Construction
Home Age

*These are the variables that were statistically significant in the model.

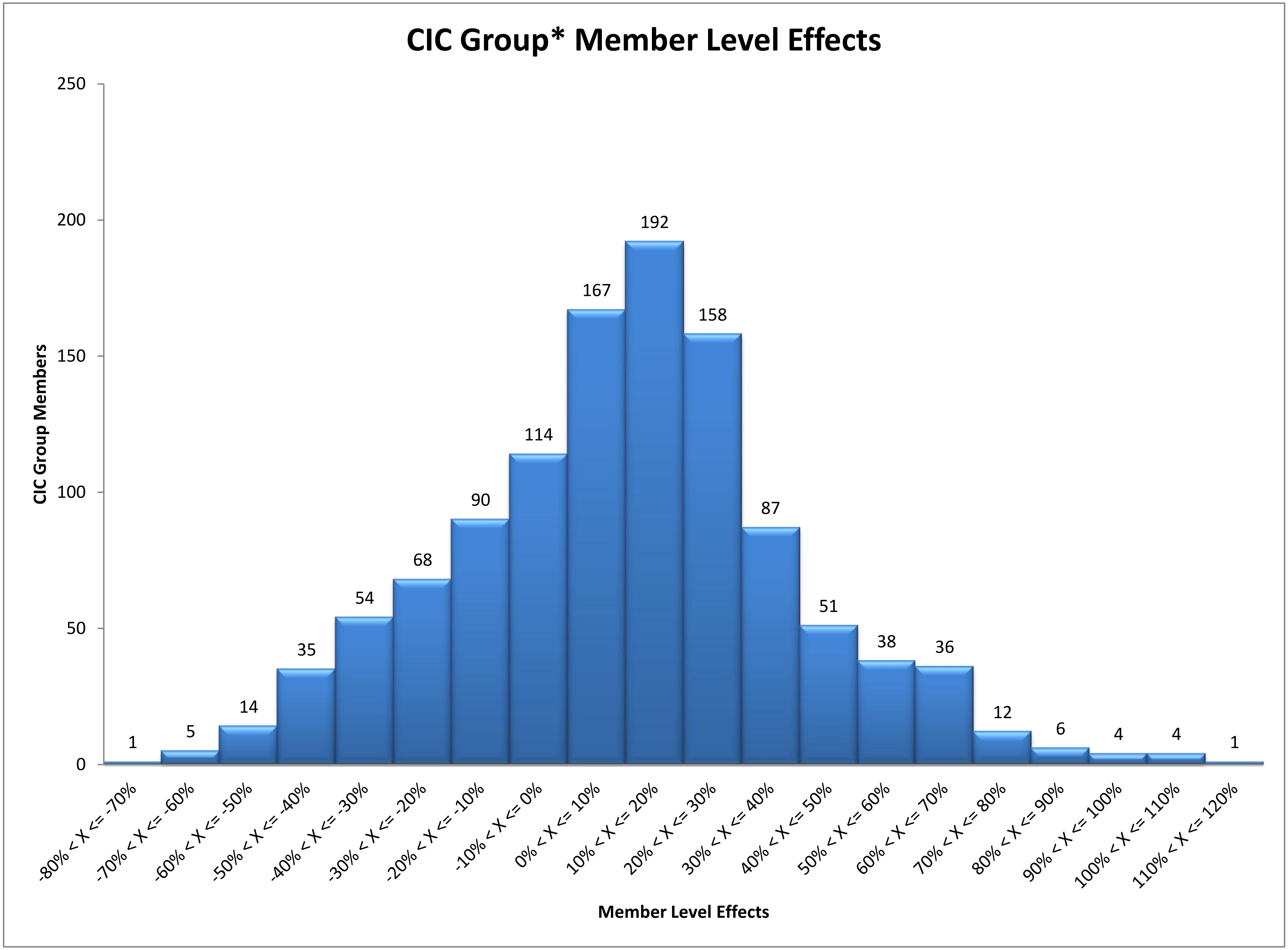
Dwelling Fire Following EQ
USAA Group
***Incorporated Variables**

Variable Description
State
Territory
Amount of Insurance
Cov B Percent
Deductible
Home Age
Rated Construction

*These are the variables that were statistically significant in the model.



USAA Member Level Effects
USAA Members
600
500
400
300
200
100
0
2
9
35
83
188
245
269
394
492
461
435
293
163
95
70
55
26
26
8
7
1
1
1
1
0
1
-80% < X <= -70%
-70% < X <= -60%
-60% < X <= -50%
-50% < X <= -40%
-40% < X <= -30%
-30% < X <= -20%
-20% < X <= -10%
-10% < X <= 0%
0% < X <= 10%
10% < X <= 20%
20% < X <= 30%
30% < X <= 40%
40% < X <= 50%
50% < X <= 60%
60% < X <= 70%
70% < X <= 80%
80% < X <= 90%
90% < X <= 100%
100% < X <= 110%
110% < X <= 120%
120% < X <= 130%
130% < X <= 140%
140% < X <= 150%
150% < X <= 160%
160% < X <= 170%
170% < X <= 180%
Member Level Effects



*CIC Group consists of USAA-CIC, USAA-GIC, and Garrison.

Superseded Schedule Items

Please note that all items on the following pages are items, which have been replaced by a newer version. The newest version is located with the appropriate schedule on previous pages. These items are in date order with most recent first.

Creation Date	Schedule Item Status	Schedule	Schedule Item Name	Replacement Creation Date	Attached Document(s)
06/27/2014		Rate	AR Rental Property Insurance Rate and Rule Manual	08/04/2014	AR RPI Rate and Rule Manual.pdf (Superceded)
06/20/2014		Supporting Document	NAIC loss cost data entry document	08/15/2014	

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE (RPI)**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

I. GENERAL RULES

State:	**ARKANSAS**
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I. GENERAL RULES

The Rental Property Insurance (RPI) Program provides property and related coverages using the forms and endorsements referred to in this manual. This manual contains the rules and classifications governing the writing of the Rental Property Insurance policy. The rules, rates, forms and endorsements of the Company for each coverage govern in all cases not specifically provided for in this manual.

Throughout this manual, the term *Dwelling* includes townhouses.

FORMS AVAILABILITY

1. AMOUNT OF INSURANCE AND COVERAGE RELATIONSHIPS

a. The minimum amounts of Insurance under the Rental Property Insurance policy are as follows:

Section I--Property Damage

Coverage	DP-3	DP-3 w/DP-1766 (condo/co-op)	DP-3 with No Coverage A
A -Dwelling Minimum Limit	$10,000	$3,000	N/A
B -Other Structures	10% of A	N/A	$1,000
C -Personal Property (Optional coverage when A or B is included on the policy. If purchased, minimum limits apply)	$2,500	$2,500	$500
D -Fair Rental Value & E -Additional Living Expense (up to 12 months)	10% of A	10% of A	N/A

Section II--Liability - All Forms

Coverage L--Personal Liability $300,000 Each Occurrence
Coverage M--Medical Payments to Others $5,000 Each Person

b. The amount of insurance for Coverage A, Coverage B, Coverage C, Coverage D of Section I, and Coverage L of Section II may be increased.

2. DESCRIPTION OF COVERAGES

a. Section I Coverages-Property Damage

Consult the policy for exact contract conditions.

(1) Dwelling-Coverage A, Other Structures-Coverage B, Fair Rental Value - Coverage D, and Additional Living Expense - Coverage E: Insures against all risks with certain exceptions.

(2) Personal Property Coverage C: Insures against loss caused by Named Perils such as Fire or Lightning, Windstorm or Hail, Explosion, Theft, etc., on a replacement cost basis for most items.

b. Section II Coverages--Liability--All Forms

(1) Coverage L--Personal Liability

Covers payment on behalf of an insured of all sums which an insured becomes legally obligated to pay as damages because of a covered bodily injury or property damage loss arising out of an insured's premises. If the premises is owner occupied, coverage is also provided for personal activities.

(2) Coverage M--Medical Payments to Others

Covers medical expenses incurred by persons, other than an insured, who sustain a covered bodily injury loss caused by an accident arising out of an insured's premises. If the premises is owner occupied, coverage is also provided for personal activities.

3. ELIGIBILITY

a. A Rental Property Insurance policy may be issued:

(1) Coverage A - On a dwelling building:
- (a) used solely for residential purposes (up to 5 roomers or boarders are permitted);
- (b) containing not more than 4 apartments;
- (c) which may be a townhouse or row house structure;
- (d) which may be a unit within a condominium or co-operative; or
- (e) in the course of construction.

(2) Coverage B:
- (a) on the same location as the dwelling or townhouse eligible for insurance under Coverage A;
- (b) on a structure not used for business purposes except when rented for use as a private garage; or
- (c) on a structure at a separate location when used in connection with an insured location, and not:
  - (i) rented to others;
  - (ii) capable of being used as a dwelling; or
  - (iii) used for business purposes.

b. Unit-Owners

When the policy covers a condominium or co-operative, endorsement DP-1766 - Unit-Owners Coverage will be attached.

c. Owner Occupied Dwelling

When the policy covers dwelling, townhouse, condominium or co-operative that is in whole, or part owner occupied, DP-OC Owner Occupied endorsement will be attached.

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4. MANDATORY COVERAGES

Section I - It is mandatory that insurance be written for all policies covering a dwelling, townhouse, condominium or cooperative. Coverage B must be written for all policies which include Coverage A.

Section II - If Coverage L is purchased, Coverage M must be included. Coverage M cannot be purchased without Coverage L.

5. DEDUCTIBLES

Deductible Options - For Dwelling and Townhome Policies

Available All Other Perils Deductibles and Wind/Hail Deductibles:

$500 (Default)
$1,000
$2,000
$5,000
$10,000
1%
2%

Deductible Options - For Condominium and Cooperative Policies

Available All Perils Deductibles:

Coverage A Less than $50,000
$250
$500 (Default)
$1,000

Coverage A $50,000 or Greater
$250
$500 (Default)
$1,000
1%
2%

Deductible Options - Other Structures

Available All Other Perils Deductibles and Wind/Hail Deductibles:

$500

6. OPTIONAL COVERAGES

For optional Section I and II Coverages, see the Optional Coverages Section of this manual.

7. POLICY PERIOD

The Rental Property Insurance policy may be written for a period of one year and may be extended for successive policy periods by renewal certificate based upon the premiums, forms and endorsements then in effect for the Company.

8. RENEWAL PREMIUM

The continuation premium will be based upon the premiums in effect at the time of renewal. The then current editions of the applicable forms and endorsements must be made a part of the policy.

9. OTHER INSURANCE

Credit for existing insurance is not permitted.

10. CANCELLATION OR REDUCTIONS IN AMOUNTS OF INSURANCE OR COVERAGES

It is not permissible to cancel any of the mandatory coverages in the policy unless the entire policy is cancelled.

If insurance is cancelled or reduced at the request of either the insured or insurer, the earned premium will be computed on a pro rata basis.

11. MANUAL PREMIUM REVISION

A manual premium revision, meaning any revision of premium applicable to the Rental Property Insurance Program will be made in accordance with the following procedures:

- **a.** The effective date of such revision will be as announced.
- **b.** The revision will apply to any policy or endorsement in the manner outlined in the announcement of the revision.
- **c.** When an existing Rental Property Insurance policy is endorsed to take advantage of a reduction in premium, the adjustment will be made on a pro rata basis.
- **d.** Unless otherwise provided at the time the premium revision becomes effective, the premium revision does not affect in-force policy forms and endorsements until the policy is renewed.

12. RESTRICTION OF INDIVIDUAL POLICIES

If a Rental Property Insurance policy would not be issued because of unusual circumstances or exposures, the named insured may request a restriction of the policy provided no reduction in the premium is allowed.

13. SPECIAL STATE REQUIREMENTS

A Rental Property Insurance policy may be endorsed to comply with special state requirements. When required, the state Special Provisions endorsement will be attached to all Rental Property Insurance policies issued in that state.

14. ADJUSTED BUILDING COST

The Rental Property Insurance policy provides for automatic increases in the limit of liability for Coverage A at each renewal.

For condominiums, the Rental Property Insurance policy provides for automatic increases in the limit of liability for Coverage A at each renewal when the insured carries coverage in excess of the amount automatically provided with the policy.

The insured may refuse any increase at renewal, in which case, the dwelling amount will be adjusted.

15. CLASSIFICATION OF PUBLIC FIRE PROTECTION (PPC)

Public Protection Classifications are determined by using one of the following methods:

A. Using LOCATION™

(1) LOCATION™ is a database that can be used to obtain Public Protection Classifications for specific locations. LOCATION™ follows the Fire Suppression Rating Schedule and Public Protection Classification manual rules in assigning the PPC for a specific location.

(2) In the event that LOCATION™ produces a split classification (e.g., in a 6/9 – community where water source/hydrant information is not available) the classification number will be determined as follows:

(a) If the risk address is within 1000 feet of an approved water source, then the PPC is assigned the lower-numbered class (e.g., class 6 in the example above).

(b) Otherwise the risk is assigned a PPC 9.

B. Applying the following manual rules

(1) For jurisdictions listed with a single classification number, all properties within the jurisdiction should receive the listed classification number.

(2) For jurisdictions listed with multiple classification numbers (e.g. 6/9), known as a "split classification", the classification number applicable to individual properties is determined as follows:

15. CLASSIFICATION OF PUBLIC FIRE PROTECTION (PPC) (Cont'd)

(a) Split classifications shown as "X/9" or "X/8B"(e.g.6/9 or 6/8B):

i. For properties located five road miles or less from a responding fire station of a designated recognized fire department indicated in the listing for the jurisdiction, and within 1,000 feet of a fire hydrant, the first listed classification number applies. (e.g., 6/9, use class 6).

ii. For properties located five road miles or less from a responding fire station of a designated recognized fire department indicated in the listing for the jurisdiction, and with a fire hydrant more than 1,000 feet, class 9 or class 8B applies.

iii. For properties not qualifying for 2(a)i.or 2(a)ii., class 10 applies.

(b) Split classifications displayed as "X/10" where no hydrants are installed (e.g. 9/10); or where hydrant distance does not apply due to an alternate creditable water supply (e.g. 7/10):

i. For properties located within five road miles or less from a responding fire station of a designated recognized fire department indicated in the listing for the jurisdiction, the first listed classification applies (e.g., 7/10, use class 7).

ii. For properties not qualifying for 2(b)i.above, class 10 applies.

(3) For jurisdictions or areas not listed, class 10 applies.

Class 10 applies to individual properties that do not subscribe to the listed subscription fire department.

(4) Definitions

a. "Recognized Fire Department" means a fire department meeting the minimum criteria of ISO's Fire Suppression Rating Schedule (FSRS).

b. "Primary Fire Department" means the fire department that has primary overall responsibility for the jurisdiction.

16. PREMIUM DETERMINATION

1. From the rate pages, select the appropriate factors for underwriting tier, territory, protection/construction, roof type, square footage, and number of families.

2. Using the amount of insurance/deductible tables from the rate pages, determine the applicable factors for the desired deductible and amount of insurance. If the limit is not shown in the chart, use the following rules to determine the applicable factor.

   a. If the desired limit is less than the highest limit shown, use linear interpolation between the nearest limit above and below the desired limit to determine the applicable factor.

   b. If the desired limit is more than the highest limit shown, add the applicable incremental additional amount to the factor for the highest limit shown to determine the applicable factor.

3. Multiply the base rate for each peril by the appropriate factors for underwriting tier, territory, amount of insurance/deductible, protection/construction, roof type, square footage, and number of families.

4. Multiply the result by the appropriate factors for Builder's Risk, Vacancy, Increased Other Structures Limit, and Home Protector Coverage if applicable.

5. For other Optional Coverages, determine the premium by selecting the rate from the rate pages and multiplying by any applicable rating factors.

Note: Discounts and Surcharges if applicable would modify the above calculated rate.

6. A minimum premium must be charged for each policy. The applicable minimum premium is listed in the State Rate pages.

16. PREMIUM DETERMINATION (Cont'd)

7. Rate Capping

Policy renewal premium changes shall be capped. However, where applicable, if on renewal, there is no proof of fire subscription, the resulting premium adjustment shall not be capped. The capped renewal premium shall be determined as described below:

a. Calculate the full renewal premium and compare to the expiring prior term premium.

b. The premium change on the renewal policy is capped at the cap (shown on the rate pages) from the expiring prior term premium.

c. Premium adjustments to the policy other than at renewal will be capped at the same proportion as the policy’s capped to uncapped premium ratio immediately prior to the adjustment.

d. The ratio of the policy’s capped to uncapped premium shall be applied to all coverages on the policy.

e. If the difference between the full renewal premium and the expiring prior term premium does not exceed the applicable cap, the renewal premium is not capped.

17. ZIP CODE DETERMINATION

As zip codes are changed by the United States Postal Services (USPS), a new zip code may be created. This new zip code may not yet be listed in the rate manual pages. If this is the case, use the rating territory that corresponds to the zip code that formerly applied to the risk.

II. DISCOUNTS/SURCHARGES

1. Protective Device Credit

a.) Monitored Fire Alarm Credit

An approved and properly installed and maintained fire alarm in the residence may be recognized for a reduction in premium. To be eligible, the alarm must be centrally monitored by a paid service. Refer to the State Rate pages for the applicable credit.

b.) Automatic Sprinkler Credit

An approved and properly installed and maintained internal sprinkler system in the residence may be recognized for a premium credit. To be eligible, the system must be in use in the entire living area except for attics, bathrooms, closets, and any attached structures. Refer to the State Rate pages for the applicable credit.

2. Multi-Product Discount

The policy is eligible for a premium discount if the Named Insured or the spouse of the Named Insured has one of the following written by the USAA Group:

1. An active Auto policy only;
2. An active Auto policy plus an Active Homeowners and/or Renters
3. An Active Homeowners and/or Renters only;

Refer to the State Rate pages for the applicable discount.

3. Home Age Discount

All Dwelling policies are eligible for a premium discount based on the age in years of the dwelling. Refer to the State Rate pages for the applicable discount.

4. Claims Free Discount

The policy is eligible for a premium discount if no chargeable Rental Property Insurance claims have been paid for the Named Insured in the five years immediately preceding the effective date of the policy. Refer to the State Rate Pages for the applicable discount.

A claim is not considered chargeable if any of the following apply:

a. total payments on a claim are less than or equal to $500
b. a claim occurred at a location other than the property risk address
c. a claim was paid under Medical Payments to Others coverage
d. For new policies the incident resulting in a claim took place prior to October 31, 2014.
e. For renewal policies, the incident resulting in a claim took place prior to the policy's first renewal on or after January 1, 2015.
f. a claim was reported to us as catastrophe related or was weather related
g. a claim was reported to us as wildfire related

5. Claims Activity Surcharge

A premium surcharge will be applied to the policy for any chargeable Rental Property Insurance claims paid for the Named Insured in the three years immediately preceding the effective date of the policy. Refer to the State Rate Pages for the applicable surcharge.

A claim is not considered chargeable if any of the following apply:

a. total payments on a claim are less than or equal to $500
b. a claim that occurred at a location other than the policy risk address
c. a claim was paid under Medical Payments to Others coverage
d. For new policies the incident resulting in a claim took place prior to October 31, 2014.
e. For renewal policies, the incident resulting in a claim took place prior to the policy's first renewal on or after January 1, 2015.
f. a claim was reported to us as catastrophe related or was weather related
g. a claim was reported to us as wildfire related

III. OPTIONAL COVERAGES

1. Home Protector - Form DP-3

Form DP-3 may be endorsed to provide an additional percentage of the Coverage A limit to apply to a covered loss when:

(1) the limit of liability applying to a building covered under Coverages A or B is exhausted:
(2) the limit of liability provided under Additional Coverages, Debris Removal is exhausted;
(3) the limit of liability provided under Additional Coverages, Building Ordinance is exhausted.

The most that will be paid for (1), (2) or (3), either singly or in any combination is 25% of Coverage A.

A. Eligibility

A dwelling is used principally for private residential purposes. The dwelling may not be a mobile home.

B. Rules

1. The dwelling must be insured for 100% of value at the time this endorsement is applied. The value is to be determined by one of this Company's accepted methods for determining value.

2. The insured must annually accept any applicable adjusted building cost increase.

3. To maintain the replacement cost provisions, the insured must notify the Company of any additions or other physical changes which change the value of either the dwelling or other structures on the residence premises by 25,000 OR 5% which ever is greater.

C. Rates

1. When the DP-3 policy is endorsed with Home Protector, the additional percentage of coverage will be 25%. See State Rate pages for applicable charge.

   Use Endorsement DP-125 Home Protector Coverage

2. Optional Limits for Other Structures

When Coverage A is written, Coverage B - Other Structures, may be increased above the contract limit of 10%. The following optional percentage of Coverage A limits are available:

15%, 25%, 50%, 75% and 100%. See State Rate pages.

3. Vacancy/Unoccupied

When the dwelling is vacant or unoccupied a surcharge will apply and the DP-VAC- Amendment to Glass or Vandalism Coverage will be added.

A dwelling is vacant if it is unoccupied and contains no furniture. A dwelling is unoccupied when no one resides there at the time of loss and there is not a lease on the property.

4. Earthquake Coverage

The policy may be endorsed to add earthquake coverage.

A. The earthquake peril applies to all Section I Coverages for the same limits provided in the policy. When earthquake is added, the additional premium will be developed according to B below.

A deductible of 10% applies. The deductible will be a percentage of Coverage A, Coverage B, or Coverage C, whichever is higher.

Coverage for masonry veneer may be excluded. When coverage is excluded rate as frame.

Use Endorsement DP 370 Earthquake

B. Premiums

See Premium Determination section with the following exception:
i. Replace territory with Earthquake Zone

Zone Definition

Zone 2: Clay, Craighead, Crittenden, Cross, Greene, Jackson, Mississippi, Poinsett
Zone 3: Independence, Lawrence, Lee, Monroe, Phillips, Randolph, St. Francis, Woodruff, White
Zone 4: Arkansas, Baxter, Cleburne, Conway, Desha, Faulkner, Fulton, Izard, Jefferson, Little River, Lonoke, Marion, Prairie, Pulaski, Searcy, Sebastian, Sharp, Stone, Van Buren
Zone 5: Remainder of State

5. Dwelling Under Construction - Builders Risk

The policy may be endorsed with a Dwelling Under Construction - Builders Risk endorsement to provide coverage for loss caused by theft of materials and supplies that will become a part of the dwelling or other structure. This coverage applies when the building is eligible for Coverage A or Coverage B and the intended occupancy will be primary, secondary, or rental residence. Materials and supplies which will be used in the construction of the dwelling or other structure are covered up to $5,000 while at any other location within the United States or while in due course of transit.

The Coverage A limit shall be based on the contractor's estimate of the value of the dwelling upon completion.

The premium for a policy endorsed with Dwelling Under Construction - Builders Risk endorsement is determined by applying a factor to the premium for the Coverage A limit. See State Rate pages for the factor.

Use Endorsement DP-UC Dwelling Under Construction - Builders Risk.

6. Water Backup or Sump Pump Overflow - All Dwelling and Unit-owners policies.

The policy may be endorsed to provide $10,000 coverage for loss caused by water which backs up through sewers or drains or which overflows from a sump pump or sump well. The policy deductible applies to any loss covered by this endorsement. See State Rate pages.

Use Endorsement DP-208 Water Backup or Sump Pump Overflow

7. Fair Rental Value

When Coverage A is included on the policy, Fair Rental Value may be increased above the contract limit of 10% of Coverage A. When the amount is increased it will be shown on the DP-FRV Increased Fair Rental Value endorsement. See State Rate pages.

IV. SECTION II-LIMITS OF LIABILITY AND OTHER EXPOSURES

Basic limits of $300,000 for Coverage L (Personal Liability) and $5000 for Coverage M (Medical Payments to Others) are provided in the policy. When the Coverage L limit is increased see State Rate Pages.

Coverage L limits apply on an "occurrence" basis; Coverage M limits, on an "each person" basis.

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BASE RATES AND MINIMUM PREMIUMS

BASE RATES

		Non-Catastrophe							
Structure Type	Company/Covg	Fire	EC	Broad	Special	Fire Following Earthquake	Earthquake Shake*	Liability**	Medical Payments***
DWELLING	USAA Covg A	**1325.06**	**1031.07**	**--**	**268.43**	**3.62**	**47.05**	**33.61**	**8.62**
	USAA Covg C	**24.82**	**29.69**	**4.84**	**--**	**0.00**	**0.66**	**--**	**--**
	USAA-CIC Covg A	**1762.87**	**1440.49**	**--**	**372.47**	**3.62**	**47.05**	**33.61**	**8.62**
	USAA-CIC Covg C	**38.46**	**44.18**	**7.07**	**--**	**0.00**	**0.66**	**--**	**--**
	USAA-GIC Covg A	**1762.87**	**1440.49**	**--**	**372.47**	**3.62**	**47.05**	**33.61**	**8.62**
	USAA-GIC Covg C	**38.46**	**44.18**	**7.07**	**--**	**0.00**	**0.66**	**--**	**--**
	Garrison Covg A	**1762.87**	**1440.49**	**--**	**372.47**	**3.62**	**47.05**	**33.61**	**8.62**
	Garrison Covg C	**38.46**	**44.18**	**7.07**	**--**	**0.00**	**0.66**	**--**	**--**

		Non-Catastrophe							
Structure Type	Company/Covg	Fire	EC	Broad	Special	Fire Following Earthquake	Earthquake Shake*	Liability**	Medical Payments***
CONDO	USAA Covg A	**515.01**	**410.78**	**--**	**88.44**	**1.33**	**22.74**	**29.34**	**7.53**
	USAA Covg C	**25.43**	**33.86**	**4.82**	**--**	**0.00**	**1.44**	**--**	**--**
	USAA-CIC Covg A	**614.06**	**478.55**	**--**	**101.12**	**1.33**	**22.74**	**29.34**	**7.53**
	USAA-CIC Covg C	**33.48**	**39.60**	**4.94**	**--**	**0.00**	**1.44**	**--**	**--**
	USAA-GIC Covg A	**614.06**	**478.55**	**--**	**101.12**	**1.33**	**22.74**	**29.34**	**7.53**
	USAA-GIC Covg C	**33.48**	**39.60**	**4.94**	**--**	**0.00**	**1.44**	**--**	**--**
	Garrison Covg A	**614.06**	**478.55**	**--**	**101.12**	**1.33**	**22.74**	**29.34**	**7.53**
	Garrison Covg C	**33.48**	**39.60**	**4.94**	**--**	**0.00**	**1.44**	**--**	**--**

		Non-Catastrophe							
Structure Type	Company	Fire	EC	Broad****	Special****	Fire Following Earthquake	Earthquake Shake*	Liability**	Medical Payments***
MISCELLANEOUS	USAA	**301.39**	**295.44**	**--**	**62.79**	**1.32**	**13.12**	**19.50**	**5.00**
	CIC	**301.39**	**295.44**	**--**	**62.79**	**1.32**	**13.12**	**19.50**	**5.00**
	GIC	**301.39**	**295.44**	**--**	**62.79**	**1.32**	**13.12**	**19.50**	**5.00**
	Garrison	**301.39**	**295.44**	**--**	**62.79**	**1.32**	**13.12**	**19.50**	**5.00**

* Earthquake Shake is an optional coverage
** Liability is an optional coverage
*** Medical Payments is an optional coverage
**** Special base rate for Miscellaneous structure type is used for both Broad and Special coverage

MINIMUM PREMIUMS

Structure Type	USAA	USAA-CIC	USAA-GIC	Garrison
DWELLING	**$250**	**$250**	**$250**	**$250**
CONDO	**$125**	**$125**	**$125**	**$125**
MISCELLANEOUS	**$50**	**$50**	**$50**	**$50**

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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

TIER FACTORS

USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Tier	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
21	0.3016	0.5250	0.3692	0.3692	1.0000	1.0000	0.4255
22	0.3169	0.5406	0.3886	0.3886	1.0000	1.0000	0.4488
23	0.3330	0.5566	0.4084	0.4084	1.0000	1.0000	0.4722
24	0.3497	0.5729	0.4285	0.4285	1.0000	1.0000	0.4953
25	0.3672	0.5896	0.4489	0.4489	1.0000	1.0000	0.5182
26	0.3854	0.6068	0.4696	0.4696	1.0000	1.0000	0.5409
27	0.4045	0.6249	0.4906	0.4906	1.0000	1.0000	0.5632
28	0.4244	0.6405	0.5119	0.5119	1.0000	1.0000	0.5853
29	0.4453	0.6566	0.5335	0.5335	1.0000	1.0000	0.6070
30	0.4671	0.6730	0.5555	0.5555	1.0000	1.0000	0.6284
31	0.4898	0.6898	0.5778	0.5778	1.0000	1.0000	0.6496
32	0.5136	0.7069	0.6005	0.6005	1.0000	1.0000	0.6706
33	0.5385	0.7243	0.6237	0.6237	1.0000	1.0000	0.6915
34	0.5646	0.7422	0.6474	0.6474	1.0000	1.0000	0.7122
35	0.5920	0.7604	0.6717	0.6717	1.0000	1.0000	0.7329
36	0.6206	0.7789	0.6965	0.6965	1.0000	1.0000	0.7538
37	0.6506	0.7979	0.7222	0.7222	1.0000	1.0000	0.7749
38	0.6821	0.8173	0.7485	0.7485	1.0000	1.0000	0.7963
39	0.7151	0.8371	0.7758	0.7758	1.0000	1.0000	0.8183
40	0.7499	0.8574	0.8040	0.8040	1.0000	1.0000	0.8409
41	0.7864	0.8780	0.8333	0.8333	1.0000	1.0000	0.8642
42	0.8248	0.8992	0.8638	0.8638	1.0000	1.0000	0.8886
43	0.8652	0.9201	0.8955	0.8955	1.0000	1.0000	0.9141
44	0.9078	0.9461	0.9288	0.9288	1.0000	1.0000	0.9410
45	0.9526	0.9727	0.9635	0.9635	1.0000	1.0000	0.9696
46	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
47	1.0499	1.0280	1.0384	1.0384	1.0000	1.0000	1.0326
48	1.1028	1.0568	1.0789	1.0789	1.0000	1.0000	1.0678
49	1.1586	1.0863	1.1215	1.1215	1.0000	1.0000	1.1058
50	1.2176	1.1165	1.1668	1.1668	1.0000	1.0000	1.1471
51	1.2801	1.1477	1.2149	1.2149	1.0000	1.0000	1.1922
52	1.3463	1.1798	1.2660	1.2660	1.0000	1.0000	1.2417
53	1.4164	1.2127	1.3205	1.3205	1.0000	1.0000	1.2962
54	1.4909	1.2466	1.3789	1.3789	1.0000	1.0000	1.3563
55	1.5699	1.2815	1.4415	1.4415	1.0000	1.0000	1.4231
56	1.6538	1.3176	1.5089	1.5089	1.0000	1.0000	1.4976
57	1.7431	1.3548	1.5818	1.5818	1.0000	1.0000	1.5809
58	1.8380	1.3931	1.6608	1.6608	1.0000	1.0000	1.6746

* Earthquake Shake is an optional coverage
** Liability and Medical Payments are optional coverages

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TERRITORY FACTORS

USAA GROUP
ALL STRUCTURE TYPES
COVERAGE A, B, and C

Territory	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Liability / Medical Payments*
ALL	1.0000	1.0000	1.0000	1.0000	**1.0000**	**1.0000**

* Liability and Medical Payments are optional coverages
Please note that Earthquake Shake coverage zone factors can be found on the Misc Factors tab

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USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Fire (Non-Catastrophe)

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**0.0948**	**0.0815**	**0.0664**	**0.0521**	**0.0393**	**0.1138**	**0.1100**
$50,000	**0.4250**	**0.3652**	**0.2975**	**0.2338**	**0.1762**	**0.4250**	**0.3652**
$100,000	**0.6491**	**0.5577**	**0.4544**	**0.3570**	**0.2691**	**0.5577**	**0.4544**
$125,000	**0.7394**	**0.6353**	**0.5176**	**0.4067**	**0.3066**	**0.6006**	**0.4952**
$150,000	**0.8297**	**0.7129**	**0.5808**	**0.4563**	**0.3440**	**0.6435**	**0.5359**
$175,000	**0.9149**	**0.7861**	**0.6404**	**0.5032**	**0.3793**	**0.6718**	**0.5660**
$200,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7000**	**0.5960**
$225,000	**1.0918**	**0.9381**	**0.7643**	**0.6005**	**0.4527**	**0.7458**	**0.6170**
$250,000	**1.1837**	**1.0170**	**0.8286**	**0.6380**	**0.4907**	**0.7916**	**0.6380**
$275,000	**1.2755**	**1.0959**	**0.8928**	**0.7015**	**0.5288**	**0.8374**	**0.6590**
$300,000	**1.3673**	**1.1748**	**0.9571**	**0.7520**	**0.5668**	**0.8832**	**0.6800**
$400,000	**1.7429**	**1.4975**	**1.2200**	**0.9586**	**0.7225**	**1.0200**	**0.7500**
$500,000	**2.0392**	**1.7520**	**1.4274**	**1.1216**	**0.8454**	**1.1216**	**0.8454**
$750,000	**2.7121**	**2.3302**	**1.8985**	**1.4917**	**1.1243**	**1.2950**	**0.9713**
$1,000,000	**3.3901**	**2.9127**	**2.3731**	**1.8646**	**1.4054**	**1.4054**	**1.0541**
$1,500,000	**4.5089**	**3.8740**	**3.1562**	**2.4799**	**1.8692**	**1.6823**	**1.2617**
$2,000,000	**5.6361**	**4.8424**	**3.9453**	**3.0999**	**2.3365**	**1.9860**	**1.4895**
for each add'l $10,000 above $2,000,000, add:	**0.0225**	**0.0194**	**0.0158**	**0.0124**	**0.0093**	**0.0061**	**0.0046**

* This is the Coverage A (Dwelling) limit on the policy

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

EC (Non-Catastrophe)

	Wind/Hail Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**0.1037**	**0.0895**	**0.0726**	**0.0571**	**0.0436**	**0.1178**	**0.1140**
$50,000	**0.4913**	**0.4237**	**0.3439**	**0.2702**	**0.2064**	**0.4913**	**0.4237**
$100,000	**0.7016**	**0.6050**	**0.4911**	**0.3859**	**0.2947**	**0.6050**	**0.4911**
$125,000	**0.7824**	**0.6747**	**0.5477**	**0.4304**	**0.3286**	**0.6275**	**0.5106**
$150,000	**0.8632**	**0.7443**	**0.6042**	**0.4748**	**0.3625**	**0.6500**	**0.5300**
$175,000	**0.9316**	**0.8033**	**0.6521**	**0.5124**	**0.3913**	**0.6750**	**0.5550**
$200,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.7000**	**0.5800**
$225,000	**1.0575**	**0.9119**	**0.7403**	**0.5816**	**0.4442**	**0.7175**	**0.5900**
$250,000	**1.1150**	**0.9615**	**0.7805**	**0.6000**	**0.4683**	**0.7350**	**0.6000**
$275,000	**1.1725**	**1.0110**	**0.8208**	**0.6449**	**0.4925**	**0.7525**	**0.6100**
$300,000	**1.2300**	**1.0606**	**0.8610**	**0.6765**	**0.5166**	**0.7700**	**0.6200**
$400,000	**1.4250**	**1.2287**	**0.9975**	**0.7837**	**0.5985**	**0.8200**	**0.6455**
$500,000	**1.5973**	**1.3773**	**1.1181**	**0.8785**	**0.6709**	**0.8785**	**0.6709**
$750,000	**1.9633**	**1.6929**	**1.3743**	**1.0798**	**0.8246**	**0.9149**	**0.7200**
$1,000,000	**2.2648**	**1.9530**	**1.5854**	**1.2457**	**0.9512**	**0.9512**	**0.7610**
$1,500,000	**2.8679**	**2.4730**	**2.0075**	**1.5773**	**1.2045**	**1.0841**	**0.8672**
$2,000,000	**3.4710**	**2.9930**	**2.4297**	**1.9090**	**1.4578**	**1.2467**	**0.9973**
for each add'l $10,000 above $2,000,000, add:	**0.0121**	**0.0104**	**0.0084**	**0.0066**	**0.0051**	**0.0033**	**0.0026**

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Special (Non-Catastrophe)

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	0.0775	0.0666	0.0543	0.0426	0.0321	0.0930	0.0899
$50,000	0.3750	0.3222	0.2625	0.2062	0.1555	0.3750	0.3222
$100,000	0.6127	0.5264	0.4289	0.3370	0.2540	0.5264	0.4289
$125,000	0.7144	0.6138	0.5001	0.3929	0.2962	0.5797	0.4780
$150,000	0.8160	0.7011	0.5712	0.4488	0.3383	0.6329	0.5271
$175,000	0.9080	0.7802	0.6356	0.4994	0.3765	0.6665	0.5616
$200,000	1.0000	0.8592	0.7000	0.5500	0.4146	0.7000	0.5960
$225,000	1.0828	0.9304	0.7580	0.5956	0.4489	0.7400	0.6200
$250,000	1.1656	1.0015	0.8160	0.6440	0.4833	0.7800	0.6440
$275,000	1.2484	1.0727	0.8739	0.6867	0.5176	0.8199	0.6679
$300,000	1.3312	1.1438	0.9319	0.7322	0.5519	0.8599	0.6919
$400,000	1.6314	1.4017	1.1420	0.8973	0.6763	0.9724	0.7573
$500,000	1.9102	1.6412	1.3371	1.0506	0.7919	1.0506	0.7919
$750,000	2.4000	2.0620	1.6800	1.3200	0.9949	1.1460	0.8744
$1,000,000	3.1035	2.6664	2.1724	1.7069	1.2866	1.2866	0.9749
$1,500,000	4.2277	3.6324	2.9594	2.3252	1.7526	1.5404	1.1553
$2,000,000	5.3520	4.5983	3.7464	2.9436	2.2187	1.6813	1.2610
for each add'l $10,000 above $2,000,000, add:	0.0225	0.0193	0.0157	0.0124	0.0093	0.0028	0.0021

* This is the Coverage A (Dwelling) limit on the policy

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

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	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Fire Following Earthquake

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**0.1200**	**0.1147**	**0.1084**	**0.1002**	**0.0866**	**0.1256**	**0.1241**
$50,000	**0.3732**	**0.3568**	**0.3371**	**0.3117**	**0.2693**	**0.3732**	**0.3568**
$100,000	**0.6308**	**0.6029**	**0.5698**	**0.5268**	**0.4552**	**0.6029**	**0.5698**
$125,000	**0.7242**	**0.6922**	**0.6541**	**0.6048**	**0.5226**	**0.6813**	**0.6446**
$150,000	**0.8175**	**0.7814**	**0.7384**	**0.6827**	**0.5899**	**0.7596**	**0.7194**
$175,000	**0.9088**	**0.8686**	**0.8208**	**0.7589**	**0.6558**	**0.8314**	**0.7883**
$200,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9032**	**0.8572**
$225,000	**1.0875**	**1.0395**	**0.9823**	**0.9082**	**0.7848**	**0.9744**	**0.9167**
$250,000	**1.1750**	**1.1231**	**1.0613**	**0.9761**	**0.8479**	**1.0456**	**0.9761**
$275,000	**1.2625**	**1.2068**	**1.1404**	**1.0543**	**0.9111**	**1.1167**	**1.0356**
$300,000	**1.3500**	**1.2904**	**1.2194**	**1.1274**	**0.9742**	**1.1879**	**1.0950**
$400,000	**1.6200**	**1.5484**	**1.4632**	**1.3529**	**1.1690**	**1.3887**	**1.2394**
$500,000	**1.8630**	**1.7807**	**1.6827**	**1.5558**	**1.3444**	**1.5558**	**1.3444**
$750,000	**2.4778**	**2.3683**	**2.2380**	**2.0693**	**1.7880**	**1.9235**	**1.6350**
$1,000,000	**3.0972**	**2.9604**	**2.7975**	**2.5866**	**2.2350**	**2.2350**	**1.8551**
$1,500,000	**4.1193**	**3.9374**	**3.7207**	**3.4401**	**2.9726**	**2.5267**	**2.0719**
$2,000,000	**5.1492**	**4.9217**	**4.6508**	**4.3002**	**3.7157**	**3.0469**	**2.4375**
for each add'l $10,000 above $2,000,000, add:	**0.0206**	**0.0197**	**0.0186**	**0.0172**	**0.0149**	**0.0104**	**0.0073**

* This is the Coverage A (Dwelling) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Earthquake Shake*

Amount of Insurance**	Earthquake Deductible 10%
$10,000	**0.0571**
$50,000	**0.2718**
$100,000	**0.5329**
$125,000	**0.6585**
$150,000	**0.7766**
$175,000	**0.8906**
$200,000	**1.0000**
$225,000	**1.1073**
$250,000	**1.1885**
$275,000	**1.2793**
$300,000	**1.3694**
$400,000	**1.7165**
$500,000	**2.0568**
$750,000	**2.8584**
$1,000,000	**3.5751**
$1,500,000	**4.9720**
$2,000,000	**6.2927**

for each add'l $10,000 above $2,000,000, add: **0.0264**

* Earthquake Shake is an optional coverage
** This is the Coverage A (Dwelling) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Liability / Medical Payments*

	All Other Perils Deductible						
Amount of Insurance**	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**0.6923**	**0.6923**	**0.6923**	**0.6923**	**0.6923**	**0.6923**	**0.6923**
$50,000	**0.7556**	**0.7556**	**0.7556**	**0.7556**	**0.7556**	**0.7556**	**0.7556**
$100,000	**0.8348**	**0.8348**	**0.8348**	**0.8348**	**0.8348**	**0.8348**	**0.8348**
$125,000	**0.8751**	**0.8751**	**0.8751**	**0.8751**	**0.8751**	**0.8751**	**0.8751**
$150,000	**0.9161**	**0.9161**	**0.9161**	**0.9161**	**0.9161**	**0.9161**	**0.9161**
$175,000	**0.9578**	**0.9578**	**0.9578**	**0.9578**	**0.9578**	**0.9578**	**0.9578**
$200,000	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
$225,000	**1.0426**	**1.0426**	**1.0426**	**1.0426**	**1.0426**	**1.0426**	**1.0426**
$250,000	**1.0856**	**1.0856**	**1.0856**	**1.0856**	**1.0856**	**1.0856**	**1.0856**
$275,000	**1.1289**	**1.1289**	**1.1289**	**1.1289**	**1.1289**	**1.1289**	**1.1289**
$300,000	**1.1724**	**1.1724**	**1.1724**	**1.1724**	**1.1724**	**1.1724**	**1.1724**
$400,000	**1.3463**	**1.3463**	**1.3463**	**1.3463**	**1.3463**	**1.3463**	**1.3463**
$500,000	**1.5163**	**1.5163**	**1.5163**	**1.5163**	**1.5163**	**1.5163**	**1.5163**
$750,000	**1.8925**	**1.8925**	**1.8925**	**1.8925**	**1.8925**	**1.8925**	**1.8925**
$1,000,000	**2.1721**	**2.1721**	**2.1721**	**2.1721**	**2.1721**	**2.1721**	**2.1721**
$1,500,000	**2.7279**	**2.7279**	**2.7279**	**2.7279**	**2.7279**	**2.7279**	**2.7279**
$2,000,000	**3.4644**	**3.4644**	**3.4644**	**3.4644**	**3.4644**	**3.4644**	**3.4644**
for each add'l $10,000 above $2,000,000, add:	**0.0147**	**0.0147**	**0.0147**	**0.0147**	**0.0147**	**0.0147**	**0.0147**

* Liability and Medical Payments are optional coverages
** This is the Coverage A (Dwelling) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE A

Water Backup/Sump Pump Overflow*

	All Other Perils Deductible						
Amount of Insurance**	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**1.0384**	**1.0289**
$50,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**1.0000**	**0.9500**
$100,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.9500**	**0.8250**
$125,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.9145**	**0.7670**
$150,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.8845**	**0.7111**
$175,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.8546**	**0.6574**
$200,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.8250**	**0.6059**
$225,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.7958**	**0.5568**
$250,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.7670**	**0.5000**
$275,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.7387**	**0.4657**
$300,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.7111**	**0.4238**
$400,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.6059**	**0.2782**
$500,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.5000**	**0.1500**
$750,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.3116**	**0.1000**
$1,000,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.1500**	**0.0750**
$1,500,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.1000**	**0.0500**
$2,000,000	**1.0000**	**0.9500**	**0.8250**	**0.5000**	**0.1500**	**0.0750**	**0.0375**
for each add'l $10,000 above $2,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

* Water Backup/Sump Pump Overflow is an optional coverage
** This is the Coverage A (Dwelling) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Fire (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**0.0763**	**0.0669**	**0.0575**	**0.1078**	**0.0937**
$5,000	**0.1272**	**0.1115**	**0.0959**	**0.1540**	**0.1339**
$10,000	**0.2544**	**0.2231**	**0.1918**	**0.2678**	**0.2588**
$15,000	**0.3774**	**0.3311**	**0.2845**	**0.3906**	**0.3678**
$20,000	**0.4981**	**0.4367**	**0.3753**	**0.5066**	**0.4602**
$30,000	**0.7327**	**0.6424**	**0.5518**	**0.7136**	**0.6231**
$40,000	**0.9593**	**0.8409**	**0.7226**	**0.8866**	**0.7678**
$50,000	**1.1407**	**1.0000**	**0.8593**	**1.0000**	**0.8593**
$60,000	**1.2709**	**1.1142**	**0.9574**	**1.0766**	**0.9144**
$75,000	**1.4661**	**1.2854**	**1.1045**	**1.1915**	**0.9969**
$100,000	**1.7421**	**1.5273**	**1.3122**	**1.3122**	**1.0692**
$125,000	**1.9845**	**1.7398**	**1.4948**	**1.4132**	**1.1651**
$150,000	**2.2268**	**1.9522**	**1.6774**	**1.5141**	**1.2609**
$200,000	**2.6838**	**2.3529**	**2.0216**	**1.6471**	**1.4024**
$300,000	**3.6696**	**3.2172**	**2.7642**	**2.0781**	**1.6000**
$500,000	**5.4729**	**4.7981**	**4.1224**	**2.6391**	**1.9892**
$1,000,000	**9.0986**	**7.9767**	**6.8534**	**3.3068**	**2.4801**

for each add'l $10,000 above $1,000,000, add:	$250	$500	$1,000	1%	2%
	0.0725	**0.0636**	**0.0546**	**0.0134**	**0.0098**

* This is the Coverage A (Building Items) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

EC (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**0.0685**	**0.0633**	**0.0547**	**0.0965**	**0.0839**
$5,000	**0.1142**	**0.1055**	**0.0911**	**0.1379**	**0.1199**
$10,000	**0.2284**	**0.2111**	**0.1822**	**0.2398**	**0.2320**
$15,000	**0.3426**	**0.3167**	**0.2732**	**0.3540**	**0.3373**
$20,000	**0.4567**	**0.4223**	**0.3641**	**0.4643**	**0.4358**
$30,000	**0.6853**	**0.6334**	**0.5463**	**0.6745**	**0.6149**
$40,000	**0.9137**	**0.8445**	**0.7283**	**0.8716**	**0.7726**
$50,000	**1.0818**	**1.0000**	**0.8624**	**1.0000**	**0.8624**
$60,000	**1.1825**	**1.0931**	**0.9427**	**1.0579**	**0.8898**
$75,000	**1.3336**	**1.2329**	**1.0631**	**1.1447**	**0.9310**
$100,000	**1.5447**	**1.4280**	**1.2314**	**1.2314**	**0.9996**
$125,000	**1.7227**	**1.5925**	**1.3732**	**1.2772**	**1.0392**
$150,000	**1.9007**	**1.7570**	**1.5150**	**1.3230**	**1.0788**
$200,000	**2.2019**	**2.0354**	**1.7551**	**1.4248**	**1.1805**
$300,000	**2.7083**	**2.5036**	**2.1588**	**1.5673**	**1.2620**
$500,000	**3.5170**	**3.2512**	**2.8034**	**1.7881**	**1.3656**
$1,000,000	**4.9868**	**4.6098**	**3.9752**	**1.9361**	**1.5489**
for each add'l $10,000 above $1,000,000, add:	**0.0294**	**0.0272**	**0.0234**	**0.0034**	**0.0033**

* This is the Coverage A (Building Items) limit on the policy

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Special (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**0.0707**	**0.0620**	**0.0533**	**0.0998**	**0.0868**
$5,000	**0.1179**	**0.1033**	**0.0888**	**0.1426**	**0.1240**
$10,000	**0.2357**	**0.2067**	**0.1776**	**0.2480**	**0.2397**
$15,000	**0.3536**	**0.3101**	**0.2664**	**0.3659**	**0.3445**
$20,000	**0.4717**	**0.4133**	**0.3552**	**0.4797**	**0.4357**
$30,000	**0.7075**	**0.6203**	**0.5328**	**0.6891**	**0.6016**
$40,000	**0.9432**	**0.8269**	**0.7104**	**0.8717**	**0.7549**
$50,000	**1.1405**	**1.0000**	**0.8592**	**1.0000**	**0.8592**
$60,000	**1.2927**	**1.1334**	**0.9739**	**1.0944**	**0.9292**
$75,000	**1.5211**	**1.3336**	**1.1459**	**1.2360**	**1.0341**
$100,000	**1.8637**	**1.6339**	**1.4037**	**1.4037**	**1.1437**
$125,000	**2.1729**	**1.9049**	**1.6367**	**1.5457**	**1.2747**
$150,000	**2.4821**	**2.1760**	**1.8696**	**1.6877**	**1.4056**
$200,000	**3.0416**	**2.6667**	**2.2912**	**1.8667**	**1.5893**
$300,000	**4.0493**	**3.5499**	**3.0501**	**2.2931**	**1.8451**
$500,000	**5.8104**	**5.0939**	**4.3765**	**2.8016**	**2.1117**
$1,000,000	**9.4397**	**8.2760**	**7.1104**	**3.4309**	**2.5997**
for each add'l $10,000 above $1,000,000, add:	**0.0726**	**0.0636**	**0.0547**	**0.0126**	**0.0098**

* This is the Coverage A (Building Items) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)** **JANUARY 1, 2015 (RENEWAL BUSINESS)**
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION** **USAA CASUALTY INSURANCE COMPANY** **USAA GENERAL INDEMNITY COMPANY** **GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY**

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)** **JANUARY 1, 2015 (RENEWAL BUSINESS)**
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION** **USAA CASUALTY INSURANCE COMPANY** **USAA GENERAL INDEMNITY COMPANY** **GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY**

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)** **JANUARY 1, 2015 (RENEWAL BUSINESS)**
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION** **USAA CASUALTY INSURANCE COMPANY** **USAA GENERAL INDEMNITY COMPANY** **GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY**

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
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	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
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	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
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Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
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	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Fire Following Earthquake

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**0.0992**	**0.0965**	**0.0922**	**0.1355**	**0.1178**
$5,000	**0.1653**	**0.1608**	**0.1537**	**0.1935**	**0.1683**
$10,000	**0.3307**	**0.3215**	**0.3073**	**0.3365**	**0.3325**
$15,000	**0.4290**	**0.4175**	**0.3990**	**0.4344**	**0.4268**
$20,000	**0.5086**	**0.4949**	**0.4729**	**0.5118**	**0.5003**
$30,000	**0.7028**	**0.6835**	**0.6533**	**0.6988**	**0.6774**
$40,000	**0.8746**	**0.8508**	**0.8130**	**0.8601**	**0.8280**
$50,000	**1.0281**	**1.0000**	**0.9561**	**1.0000**	**0.9561**
$60,000	**1.1618**	**1.1300**	**1.0803**	**1.1182**	**1.0661**
$75,000	**1.3623**	**1.3250**	**1.2666**	**1.2956**	**1.2312**
$100,000	**1.7377**	**1.6902**	**1.6155**	**1.6155**	**1.5268**
$125,000	**1.9948**	**1.9404**	**1.8546**	**1.8254**	**1.7272**
$150,000	**2.2519**	**2.1905**	**2.0938**	**2.0354**	**1.9277**
$200,000	**2.7546**	**2.6795**	**2.5611**	**2.4202**	**2.2969**
$300,000	**3.7189**	**3.6174**	**3.4577**	**3.1830**	**2.9341**
$500,000	**5.1318**	**4.9920**	**4.7714**	**4.1688**	**3.6024**
$1,000,000	**8.5319**	**8.2990**	**7.9325**	**5.9887**	**4.9707**

for each add'l $10,000 above $1,000,000, add:	**0.0680**	**0.0661**	**0.0632**	**0.0364**	**0.0274**

* This is the Coverage A (Building Items) limit on the policy

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	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Earthquake Shake*

Amount of Insurance**	**Earthquake Deductible** 10%
$3,000	**0.0629**
$5,000	**0.1050**
$10,000	**0.2101**
$15,000	**0.3088**
$20,000	**0.4076**
$30,000	**0.6050**
$40,000	**0.8025**
$50,000	**1.0000**
$60,000	**1.1921**
$75,000	**1.4803**
$100,000	**1.9606**
$125,000	**2.4227**
$150,000	**2.8572**
$200,000	**3.6792**
$300,000	**5.0383**
$500,000	**7.5673**
$1,000,000	**13.1534**

for each add'l $10,000 above $1,000,000, add: **0.1117**

* Earthquake Shake is an optional coverage
** This is the Coverage A (Building Items) limit on the policy

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Liability / Medical Payments*

	All Perils Deductible				
Amount of Insurance**	$250	$500	$1,000	1%	2%
$3,000	**0.8980**	**0.8980**	**0.8980**	**0.8980**	**0.8980**
$5,000	**0.9071**	**0.9071**	**0.9071**	**0.9071**	**0.9071**
$10,000	**0.9162**	**0.9162**	**0.9162**	**0.9162**	**0.9162**
$15,000	**0.9267**	**0.9267**	**0.9267**	**0.9267**	**0.9267**
$20,000	**0.9372**	**0.9372**	**0.9372**	**0.9372**	**0.9372**
$30,000	**0.9581**	**0.9581**	**0.9581**	**0.9581**	**0.9581**
$40,000	**0.9791**	**0.9791**	**0.9791**	**0.9791**	**0.9791**
$50,000	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
$60,000	**1.0210**	**1.0210**	**1.0210**	**1.0210**	**1.0210**
$75,000	**1.0524**	**1.0524**	**1.0524**	**1.0524**	**1.0524**
$100,000	**1.1048**	**1.1048**	**1.1048**	**1.1048**	**1.1048**
$125,000	**1.1582**	**1.1582**	**1.1582**	**1.1582**	**1.1582**
$150,000	**1.2124**	**1.2124**	**1.2124**	**1.2124**	**1.2124**
$200,000	**1.3235**	**1.3235**	**1.3235**	**1.3235**	**1.3235**
$300,000	**1.5516**	**1.5516**	**1.5516**	**1.5516**	**1.5516**
$500,000	**2.0067**	**2.0067**	**2.0067**	**2.0067**	**2.0067**
$1,000,000	**2.8747**	**2.8747**	**2.8747**	**2.8747**	**2.8747**
for each add'l $10,000 above $1,000,000, add:	**0.0174**	**0.0174**	**0.0174**	**0.0174**	**0.0174**

* Liability and Medical Payments are optional coverages
** This is the Coverage A (Building Items) limit on the policy

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Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE A

Water Backup/Sump Pump Overflow*

	All Perils Deductible				
Amount of Insurance**	$250	$500	$1,000	1%	2%
$3,000	**1.0250**	**1.0000**	**0.9500**	**1.0450**	**1.0422**
$5,000	**1.0250**	**1.0000**	**0.9500**	**1.0432**	**1.0384**
$10,000	**1.0250**	**1.0000**	**0.9500**	**1.0384**	**1.0289**
$15,000	**1.0250**	**1.0000**	**0.9500**	**1.0336**	**1.0192**
$20,000	**1.0250**	**1.0000**	**0.9500**	**1.0289**	**1.0096**
$30,000	**1.0250**	**1.0000**	**0.9500**	**1.0192**	**0.9900**
$40,000	**1.0250**	**1.0000**	**0.9500**	**1.0096**	**0.9697**
$50,000	**1.0250**	**1.0000**	**0.9500**	**1.0000**	**0.9500**
$60,000	**1.0250**	**1.0000**	**0.9500**	**0.9900**	**0.9250**
$75,000	**1.0250**	**1.0000**	**0.9500**	**0.9750**	**0.8845**
$100,000	**1.0250**	**1.0000**	**0.9500**	**0.9500**	**0.8250**
$125,000	**1.0250**	**1.0000**	**0.9500**	**0.9145**	**0.7670**
$150,000	**1.0250**	**1.0000**	**0.9500**	**0.8845**	**0.7111**
$200,000	**1.0250**	**1.0000**	**0.9500**	**0.8250**	**0.6059**
$300,000	**1.0250**	**1.0000**	**0.9500**	**0.7111**	**0.4238**
$500,000	**1.0250**	**1.0000**	**0.9500**	**0.5000**	**0.1500**
$1,000,000	**1.0250**	**1.0000**	**0.9500**	**0.1500**	**0.0750**

for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

* Water Backup/Sump Pump Overflow is an optional coverage
** This is the Coverage A (Building Items) limit on the policy

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	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

Fire (Non-Catastrophe)

Amount of Insurance*	All Perils Deductible $500
$1,000	**0.0200**
$3,000	**0.0600**
$5,000	**0.1000**
$10,000	**0.2000**
$15,000	**0.3000**
$20,000	**0.4000**
$30,000	**0.6000**
$40,000	**0.8000**
$50,000	**1.0000**
$75,000	**1.5000**
$100,000	**2.0000**
$125,000	**2.5000**
$150,000	**3.0000**
$200,000	**4.0000**
$300,000	**6.0000**
$500,000	**10.0000**
$1,000,000	**20.0000**

for each add'l $10,000 above $1,000,000, add: **0.2000**

* This is the Total Coverage (B & C) limit on the policy.

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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

EC (Non-Catastrophe)

Amount of Insurance*	All Perils Deductible $500
$1,000	**0.0200**
$3,000	**0.0600**
$5,000	**0.1000**
$10,000	**0.2000**
$15,000	**0.3000**
$20,000	**0.4000**
$30,000	**0.6000**
$40,000	**0.8000**
$50,000	**1.0000**
$75,000	**1.5000**
$100,000	**2.0000**
$125,000	**2.5000**
$150,000	**3.0000**
$200,000	**4.0000**
$300,000	**6.0000**
$500,000	**10.0000**
$1,000,000	**20.0000**

for each add'l $10,000 above $1,000,000, add: **0.2000**

* This is the Total Coverage (B & C) limit on the policy.

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

Special (Non-Catastrophe)

Amount of Insurance*	All Perils Deductible $500
$1,000	**0.0200**
$3,000	**0.0600**
$5,000	**0.1000**
$10,000	**0.2000**
$15,000	**0.3000**
$20,000	**0.4000**
$30,000	**0.6000**
$40,000	**0.8000**
$50,000	**1.0000**
$75,000	**1.5000**
$100,000	**2.0000**
$125,000	**2.5000**
$150,000	**3.0000**
$200,000	**4.0000**
$300,000	**6.0000**
$500,000	**10.0000**
$1,000,000	**20.0000**

for each add'l $10,000 above $1,000,000, add: **0.2000**

* This is the Total Coverage (B & C) limit on the policy.

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

Fire Following Earthquake **All Perils Deductible**

Amount of Insurance*	$500
$1,000	**0.0200**
$3,000	**0.0600**
$5,000	**0.1000**
$10,000	**0.2000**
$15,000	**0.3000**
$20,000	**0.4000**
$30,000	**0.6000**
$40,000	**0.8000**
$50,000	**1.0000**
$75,000	**1.5000**
$100,000	**2.0000**
$125,000	**2.5000**
$150,000	**3.0000**
$200,000	**4.0000**
$300,000	**6.0000**
$500,000	**10.0000**
$1,000,000	**20.0000**

for each add'l $10,000 above $1,000,000, add: **0.2000**

* This is the Total Coverage (B & C) limit on the policy.

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

Earthquake Shake*

Amount of Insurance**	Earthquake Deductible 10%
$1,000	**0.0200**
$3,000	**0.0600**
$5,000	**0.1000**
$10,000	**0.2000**
$15,000	**0.3000**
$20,000	**0.4000**
$30,000	**0.6000**
$40,000	**0.8000**
$50,000	**1.0000**
$75,000	**1.5000**
$100,000	**2.0000**
$125,000	**2.5000**
$150,000	**3.0000**
$200,000	**4.0000**
$300,000	**6.0000**
$500,000	**10.0000**
$1,000,000	**20.0000**

for each add'l $10,000 above $1,000,000, add: **0.2000**

* Earthquake Shake is an optional coverage
** This is the Total Coverage (B & C) limit on the policy.

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE / DEDUCTIBLE FACTORS

USAA GROUP
MISCELLANEOUS STRUCTURE
COVERAGE B + C

RESERVED FOR FUTURE USE

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AMOUNT OF INSURANCE FACTORS

USAA GROUP
DWELLING AND CONDO
COVERAGE C

Amount of Insurance*	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake**
$2,500	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
$3,000	**1.1193**	**1.0969**	**1.1708**	**1.1193**	**1.1953**
$4,000	**1.3578**	**1.2693**	**1.5017**	**1.3578**	**1.5826**
$5,000	**1.5963**	**1.4212**	**1.8209**	**1.5963**	**1.9667**
$6,000	**1.8349**	**1.5592**	**2.1326**	**1.8349**	**2.3515**
$7,000	**2.0734**	**1.6859**	**2.4364**	**2.0734**	**2.7318**
$8,000	**2.3119**	**1.8045**	**2.7360**	**2.3119**	**3.1118**
$9,000	**2.5505**	**1.9133**	**3.0273**	**2.5505**	**3.4903**
$10,000	**2.7890**	**2.0203**	**3.3175**	**2.7890**	**3.8687**
$15,000	**3.9817**	**2.4819**	**4.7120**	**3.9817**	**5.7447**
$20,000	**5.1743**	**2.8717**	**6.0417**	**5.1743**	**7.6061**
$30,000	**7.5596**	**3.5276**	**8.5827**	**7.5596**	**11.2993**
$40,000	**9.9450**	**4.0801**	**11.0010**	**9.9450**	**14.9588**
$50,000	**12.3303**	**4.5703**	**13.3470**	**12.3303**	**18.6085**
$75,000	**18.2936**	**5.6165**	**18.9654**	**18.2936**	**27.6216**
$100,000	**24.2569**	**6.4874**	**24.2991**	**24.2569**	**36.5141**
$200,000	**48.1101**	**9.1197**	**44.0299**	**48.1101**	**72.0843**
for each add'l $10,000 above $200,000, add:	**1.3000**	**0.2424**	**1.9326**	**1.3000**	**3.5570**

* This is the Coverage C (Contents) limit on the policy.
** Earthquake Shake is an optional coverage.

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	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

Fire (Non-Catastrophe)

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**1.2004**	**1.1603**
$50,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**1.0000**	**0.8592**
$100,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.8592**	**0.7000**
$125,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.8123**	**0.6697**
$150,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7756**	**0.6459**
$175,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7343**	**0.6186**
$200,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7000**	**0.5960**
$225,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6831**	**0.5651**
$250,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6688**	**0.5500**
$275,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6565**	**0.5167**
$300,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6459**	**0.4973**
$400,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.5852**	**0.4303**
$500,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.5500**	**0.4146**
$750,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.4775**	**0.3581**
$1,000,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.4146**	**0.3109**
$1,500,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.3731**	**0.2798**
$2,000,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.3524**	**0.2643**
for each add'l $10,000 above $2,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Dwelling) limit on the policy.

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

EC (Non-Catastrophe)

	Wind/Hail Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**1.1360**	**1.0993**
$50,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**1.0000**	**0.8623**
$100,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.8623**	**0.7000**
$125,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.8020**	**0.6525**
$150,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.7530**	**0.6140**
$175,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.7246**	**0.5957**
$200,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.7000**	**0.5800**
$225,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.6785**	**0.5579**
$250,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.6592**	**0.5500**
$275,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.6418**	**0.5203**
$300,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.6260**	**0.5041**
$400,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.5754**	**0.4529**
$500,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.5500**	**0.4200**
$750,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.4660**	**0.3667**
$1,000,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.4200**	**0.3360**
$1,500,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.3780**	**0.3024**
$2,000,000	**1.0000**	**0.8623**	**0.7000**	**0.5500**	**0.4200**	**0.3592**	**0.2873**
for each add'l $10,000 above $2,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Dwelling) limit on the policy.

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

Broad (Non-Catastrophe)

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**1.2000**	**1.1600**
$50,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**1.0000**	**0.8592**
$100,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.8592**	**0.7000**
$125,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.8114**	**0.6691**
$150,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7756**	**0.6460**
$175,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7340**	**0.6184**
$200,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.7000**	**0.5960**
$225,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6834**	**0.5726**
$250,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6691**	**0.5500**
$275,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6568**	**0.5350**
$300,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.6460**	**0.5198**
$400,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.5961**	**0.4642**
$500,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.5500**	**0.4146**
$750,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.4775**	**0.3643**
$1,000,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.4146**	**0.3141**
$1,500,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.3644**	**0.2733**
$2,000,000	**1.0000**	**0.8592**	**0.7000**	**0.5500**	**0.4146**	**0.3141**	**0.2356**
for each add'l $10,000 above $2,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**-0.0002**	**-0.0002**

* This is the Coverage A (Dwelling) limit on the policy

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
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Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
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DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
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Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

Fire Following Earthquake

	All Other Perils Deductible						
Amount of Insurance*	$500	$1,000	$2,000	$5,000	$10,000	1%	2%
$10,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**1.0467**	**1.0342**
$50,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**1.0000**	**0.9558**
$100,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9558**	**0.9032**
$125,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9408**	**0.8901**
$150,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9292**	**0.8800**
$175,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9149**	**0.8675**
$200,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.9032**	**0.8572**
$225,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8960**	**0.8429**
$250,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8898**	**0.8351**
$275,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8845**	**0.8202**
$300,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8799**	**0.8111**
$400,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8572**	**0.7651**
$500,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.8351**	**0.7216**
$750,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.7763**	**0.6598**
$1,000,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.7216**	**0.5989**
$1,500,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.6134**	**0.5030**
$2,000,000	**1.0000**	**0.9558**	**0.9032**	**0.8351**	**0.7216**	**0.5917**	**0.4734**

for each add'l $10,000 above $2,000,000, add:

0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**-0.0005**	**-0.0004**

* This is the Coverage A (Dwelling) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
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	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

Earthquake Shake*

Amount of Insurance**	Earthquake Deductible 10%
$10,000	**1.0000**
$50,000	**1.0000**
$100,000	**1.0000**
$125,000	**1.0000**
$150,000	**1.0000**
$175,000	**1.0000**
$200,000	**1.0000**
$225,000	**1.0000**
$250,000	**1.0000**
$275,000	**1.0000**
$300,000	**1.0000**
$400,000	**1.0000**
$500,000	**1.0000**
$750,000	**1.0000**
$1,000,000	**1.0000**
$1,500,000	**1.0000**
$2,000,000	**1.0000**
for each add'l $10,000 above $2,000,000, add:	**0.0000**

* Earthquake Shake is an optional coverage
** This is the Coverage A (Dwelling) limit on the policy.

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JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
DWELLING
COVERAGE C

RESERVED FOR FUTURE USE

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

Fire (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**1.1406**	**1.0000**	**0.8592**	**1.6114**	**1.4006**
$5,000	**1.1406**	**1.0000**	**0.8592**	**1.3805**	**1.2004**
$10,000	**1.1406**	**1.0000**	**0.8592**	**1.2004**	**1.1603**
$15,000	**1.1406**	**1.0000**	**0.8592**	**1.1798**	**1.1109**
$20,000	**1.1406**	**1.0000**	**0.8592**	**1.1600**	**1.0539**
$30,000	**1.1406**	**1.0000**	**0.8592**	**1.1110**	**0.9700**
$40,000	**1.1406**	**1.0000**	**0.8592**	**1.0543**	**0.9130**
$50,000	**1.1406**	**1.0000**	**0.8592**	**1.0000**	**0.8592**
$60,000	**1.1406**	**1.0000**	**0.8592**	**0.9663**	**0.8207**
$75,000	**1.1406**	**1.0000**	**0.8592**	**0.9270**	**0.7756**
$100,000	**1.1406**	**1.0000**	**0.8592**	**0.8592**	**0.7000**
$125,000	**1.1406**	**1.0000**	**0.8592**	**0.8123**	**0.6697**
$150,000	**1.1406**	**1.0000**	**0.8592**	**0.7756**	**0.6459**
$200,000	**1.1406**	**1.0000**	**0.8592**	**0.7000**	**0.5960**
$300,000	**1.1406**	**1.0000**	**0.8592**	**0.6459**	**0.4973**
$500,000	**1.1406**	**1.0000**	**0.8592**	**0.5500**	**0.4146**
$1,000,000	**1.1406**	**1.0000**	**0.8592**	**0.4146**	**0.3109**
for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Building Items) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

EC (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**1.0818**	**1.0000**	**0.8623**	**1.5245**	**1.3254**
$5,000	**1.0818**	**1.0000**	**0.8623**	**1.3064**	**1.1360**
$10,000	**1.0818**	**1.0000**	**0.8623**	**1.1360**	**1.0993**
$15,000	**1.0818**	**1.0000**	**0.8623**	**1.1176**	**1.0649**
$20,000	**1.0818**	**1.0000**	**0.8623**	**1.0993**	**1.0318**
$30,000	**1.0818**	**1.0000**	**0.8623**	**1.0649**	**0.9708**
$40,000	**1.0818**	**1.0000**	**0.8623**	**1.0321**	**0.9149**
$50,000	**1.0818**	**1.0000**	**0.8623**	**1.0000**	**0.8623**
$60,000	**1.0818**	**1.0000**	**0.8623**	**0.9678**	**0.8140**
$75,000	**1.0818**	**1.0000**	**0.8623**	**0.9285**	**0.7552**
$100,000	**1.0818**	**1.0000**	**0.8623**	**0.8623**	**0.7000**
$125,000	**1.0818**	**1.0000**	**0.8623**	**0.8020**	**0.6525**
$150,000	**1.0818**	**1.0000**	**0.8623**	**0.7530**	**0.6140**
$200,000	**1.0818**	**1.0000**	**0.8623**	**0.7000**	**0.5800**
$300,000	**1.0818**	**1.0000**	**0.8623**	**0.6260**	**0.5041**
$500,000	**1.0818**	**1.0000**	**0.8623**	**0.5500**	**0.4200**
$1,000,000	**1.0818**	**1.0000**	**0.8623**	**0.4200**	**0.3360**
for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Building Items) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
	JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

Broad (Non-Catastrophe)

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**1.1406**	**1.0000**	**0.8592**	**1.6097**	**1.4000**
$5,000	**1.1406**	**1.0000**	**0.8592**	**1.3800**	**1.2000**
$10,000	**1.1406**	**1.0000**	**0.8592**	**1.2000**	**1.1600**
$15,000	**1.1406**	**1.0000**	**0.8592**	**1.1797**	**1.1109**
$20,000	**1.1406**	**1.0000**	**0.8592**	**1.1606**	**1.0542**
$30,000	**1.1406**	**1.0000**	**0.8592**	**1.1109**	**0.9699**
$40,000	**1.1406**	**1.0000**	**0.8592**	**1.0542**	**0.9129**
$50,000	**1.1406**	**1.0000**	**0.8592**	**1.0000**	**0.8592**
$60,000	**1.1406**	**1.0000**	**0.8592**	**0.9656**	**0.8198**
$75,000	**1.1406**	**1.0000**	**0.8592**	**0.9268**	**0.7754**
$100,000	**1.1406**	**1.0000**	**0.8592**	**0.8592**	**0.7000**
$125,000	**1.1406**	**1.0000**	**0.8592**	**0.8114**	**0.6691**
$150,000	**1.1406**	**1.0000**	**0.8592**	**0.7756**	**0.6460**
$200,000	**1.1406**	**1.0000**	**0.8592**	**0.7000**	**0.5960**
$300,000	**1.1406**	**1.0000**	**0.8592**	**0.6460**	**0.5198**
$500,000	**1.1406**	**1.0000**	**0.8592**	**0.5500**	**0.4146**
$1,000,000	**1.1406**	**1.0000**	**0.8592**	**0.4146**	**0.3141**
for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**-0.0003**	**-0.0002**

* This is the Coverage A (Building Items) limit on the policy.

State:	**ARKANSAS**
Line of Business:	**RENTAL PROPERTY INSURANCE**
Effective:	**OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
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Companies:	**UNITED SERVICES AUTOMOBILE ASSOCIATION**
	USAA CASUALTY INSURANCE COMPANY
	USAA GENERAL INDEMNITY COMPANY
	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

RESERVED FOR FUTURE USE

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DEDUCTIBLE FACTORS

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DEDUCTIBLE FACTORS

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COVERAGE C

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COVERAGE C

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CONDO
COVERAGE C

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DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

Fire Following Earthquake

	All Perils Deductible				
Amount of Insurance*	$250	$500	$1,000	1%	2%
$3,000	**1.0281**	**1.0000**	**0.9558**	**1.4041**	**1.2207**
$5,000	**1.0281**	**1.0000**	**0.9558**	**1.2037**	**1.0467**
$10,000	**1.0281**	**1.0000**	**0.9558**	**1.0467**	**1.0342**
$15,000	**1.0281**	**1.0000**	**0.9558**	**1.0404**	**1.0225**
$20,000	**1.0281**	**1.0000**	**0.9558**	**1.0341**	**1.0108**
$30,000	**1.0281**	**1.0000**	**0.9558**	**1.0223**	**0.9910**
$40,000	**1.0281**	**1.0000**	**0.9558**	**1.0110**	**0.9732**
$50,000	**1.0281**	**1.0000**	**0.9558**	**1.0000**	**0.9558**
$60,000	**1.0281**	**1.0000**	**0.9558**	**0.9896**	**0.9435**
$75,000	**1.0281**	**1.0000**	**0.9558**	**0.9778**	**0.9292**
$100,000	**1.0281**	**1.0000**	**0.9558**	**0.9558**	**0.9033**
$125,000	**1.0281**	**1.0000**	**0.9558**	**0.9408**	**0.8901**
$150,000	**1.0281**	**1.0000**	**0.9558**	**0.9292**	**0.8800**
$200,000	**1.0281**	**1.0000**	**0.9558**	**0.9032**	**0.8572**
$300,000	**1.0281**	**1.0000**	**0.9559**	**0.8799**	**0.8111**
$500,000	**1.0281**	**1.0000**	**0.9558**	**0.8351**	**0.7216**
$1,000,000	**1.0281**	**1.0000**	**0.9558**	**0.7216**	**0.5989**
for each add'l $10,000 above $1,000,000, add:	**0.0000**	**0.0000**	**0.0000**	**-0.0005**	**-0.0004**

* This is the Coverage A (Building Items) limit on the policy.

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DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

Earthquake Shake*

	Earthquake Deductible
Amount of Insurance**	10%
$3,000	**1.0000**
$5,000	**1.0000**
$10,000	**1.0000**
$15,000	**1.0000**
$20,000	**1.0000**
$30,000	**1.0000**
$40,000	**1.0000**
$50,000	**1.0000**
$60,000	**1.0000**
$75,000	**1.0000**
$100,000	**1.0000**
$125,000	**1.0000**
$150,000	**1.0000**
$200,000	**1.0000**
$300,000	**1.0000**
$500,000	**1.0000**
$1,000,000	**1.0000**

for each add'l $10,000 above $1,000,000, add:	**0.0000**

* Earthquake Shake is an optional coverage
** This is the Coverage A (Building Items) limit on the policy

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DEDUCTIBLE FACTORS

USAA GROUP
CONDO
COVERAGE C

RESERVED FOR FUTURE USE

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PROTECTION / CONSTRUCTION FACTORS

USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Construction Type	Protection Class	Fire* (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake**	Liability / Medical Payments***
Frame	1	0.9590	0.9688	0.9982	0.9982	1.0000	1.0000	1.0000
	2	0.9888	0.9739	0.9982	0.9982	1.0000	1.0000	1.0000
	3	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	4	1.0579	1.0400	1.0004	1.0004	1.0000	1.0000	1.0834
	5	1.2346	1.0679	1.0033	1.0033	1.0000	1.0000	1.1367
	6	1.3219	1.0820	1.0085	1.0085	1.0000	1.0000	1.4597
	7	1.3981	1.0820	1.0134	1.0134	1.0000	1.0000	1.4762
	8	1.5476	1.0820	1.0244	1.0244	1.0000	1.0000	1.7004
	8b	1.5959	1.0820	1.0493	1.0493	1.0000	1.0000	1.7251
	9	1.7892	1.0820	1.0493	1.0493	1.0000	1.0000	1.7251
	10	1.8676	1.0820	1.0549	1.0549	1.0000	1.0000	1.7251
Masonry	1	0.7700	0.9342	1.0224	1.0224	0.8822	2.3227	0.9889
	2	0.8043	0.9400	1.0224	1.0224	0.8822	2.3227	0.9889
	3	0.8300	0.9663	1.0242	1.0242	0.8822	2.3227	0.9889
	4	0.8662	0.9874	1.0247	1.0247	0.8822	2.3227	1.0714
	5	0.9994	0.9974	1.0276	1.0276	0.8822	2.3227	1.1241
	6	1.0826	1.0106	1.0329	1.0329	0.8822	2.3227	1.4436
	7	1.1209	1.0106	1.0379	1.0379	0.8822	2.3227	1.4598
	8	1.1984	1.0509	1.0490	1.0490	0.8822	2.3227	1.6816
	8b	1.2555	1.0509	1.0743	1.0743	0.8822	2.3227	1.7060
	9	1.4839	1.0509	1.0743	1.0743	0.8822	2.3227	1.7060
	10	1.5267	1.0509	1.0800	1.0800	0.8822	2.3227	1.7060

* Fire (Non-Catastrophe) factors also apply to the Fire portion of Increased Fair Rental Value coverage
** Earthquake Shake is an optional coverage. These factors also apply to the Earthquake Shake portion of Increased Fair Rental Value coverage
*** Liability and Medical Payments are optional coverages

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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

ROOF FACTORS

USAA GROUP
DWELLING
COVERAGE A

Roof Type	Code	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
Aluminum	AL	**1.2350**	**1.1471**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Asbestos	AS	**1.0000**	**1.1670**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Cloth	CL	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Concrete Tile	CN	**0.7296**	**0.5464**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Composition Shingle	CS	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Clay Tile	CT	**0.7343**	**0.5464**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Composition Over Wood	CW	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Fiberglass Shingle	FB	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Fiber Cement	FC	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Resin Formed Shingle	FE	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Foam	FM	**1.0000**	**1.1670**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Metal	MT	**1.2350**	**0.9663**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
None	NA	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Other	OT	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Plastic	PL	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Reinforced Plastic	RP	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Slate	SL	**1.1441**	**1.1198**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Tar	TR	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Unknown	UN	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
Wood Shake	WS	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
No Data	X	**1.2350**	**1.3000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**

* Earthquake Shake is an optional coverage
** Liability and Medical Payments are optional coverages

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SQUARE FOOTAGE FACTORS

USAA GROUP
DWELLING
COVERAGE A and C

Minimum	Maximum	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
0	499	**0.9761**	**0.6692**	**0.6349**	**0.6349**	**1.0000**	**1.0000**	**1.0000**
500	599	**0.9807**	**0.6692**	**0.6349**	**0.6349**	**1.0000**	**1.0000**	**1.0000**
600	699	**0.9822**	**0.6796**	**0.6483**	**0.6483**	**1.0000**	**1.0000**	**1.0000**
700	799	**0.9830**	**0.6849**	**0.6550**	**0.6550**	**1.0000**	**1.0000**	**1.0000**
800	899	**0.9845**	**0.6953**	**0.6685**	**0.6685**	**1.0000**	**1.0000**	**1.0000**
900	999	**0.9861**	**0.7126**	**0.6820**	**0.6820**	**1.0000**	**1.0000**	**1.0000**
1000	1099	**0.9876**	**0.7505**	**0.7157**	**0.7157**	**1.0000**	**1.0000**	**1.0000**
1100	1199	**0.9891**	**0.7861**	**0.7525**	**0.7525**	**1.0000**	**1.0000**	**1.0000**
1200	1299	**0.9907**	**0.8203**	**0.7892**	**0.7892**	**1.0000**	**1.0000**	**1.0000**
1300	1399	**0.9922**	**0.8529**	**0.8256**	**0.8256**	**1.0000**	**1.0000**	**1.0000**
1400	1499	**0.9938**	**0.8843**	**0.8617**	**0.8617**	**1.0000**	**1.0000**	**1.0000**
1500	1599	**0.9953**	**0.9147**	**0.8972**	**0.8972**	**1.0000**	**1.0000**	**1.0000**
1600	1699	**0.9969**	**0.9442**	**0.9322**	**0.9322**	**1.0000**	**1.0000**	**1.0000**
1700	1799	**0.9985**	**0.9723**	**0.9665**	**0.9665**	**1.0000**	**1.0000**	**1.0000**
1800	1899	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
1900	1999	**1.0016**	**1.0269**	**1.0326**	**1.0326**	**1.0000**	**1.0000**	**1.0056**
2000	2099	**1.0031**	**1.0528**	**1.0643**	**1.0643**	**1.0000**	**1.0000**	**1.0111**
2100	2199	**1.0047**	**1.0781**	**1.0950**	**1.0950**	**1.0000**	**1.0000**	**1.0165**
2200	2299	**1.0063**	**1.1028**	**1.1247**	**1.1247**	**1.0000**	**1.0000**	**1.0218**
2300	2399	**1.0079**	**1.1270**	**1.1533**	**1.1533**	**1.0000**	**1.0000**	**1.0270**
2400	2499	**1.0094**	**1.1507**	**1.1807**	**1.1807**	**1.0000**	**1.0000**	**1.0322**
2500	2599	**1.0110**	**1.1739**	**1.2071**	**1.2071**	**1.0000**	**1.0000**	**1.0372**
2600	2699	**1.0126**	**1.1966**	**1.2323**	**1.2323**	**1.0000**	**1.0000**	**1.0422**
2700	2799	**1.0142**	**1.2189**	**1.2564**	**1.2564**	**1.0000**	**1.0000**	**1.0471**
2800	2899	**1.0158**	**1.2409**	**1.2794**	**1.2794**	**1.0000**	**1.0000**	**1.0518**
2900	2999	**1.0173**	**1.2622**	**1.3013**	**1.3013**	**1.0000**	**1.0000**	**1.0565**
3000	3099	**1.0189**	**1.2832**	**1.3222**	**1.3222**	**1.0000**	**1.0000**	**1.0611**
3100	3199	**1.0205**	**1.3042**	**1.3421**	**1.3421**	**1.0000**	**1.0000**	**1.0656**
3200	3299	**1.0221**	**1.3247**	**1.3612**	**1.3612**	**1.0000**	**1.0000**	**1.0700**
3300	3399	**1.0237**	**1.3446**	**1.3793**	**1.3793**	**1.0000**	**1.0000**	**1.0743**
3400	3499	**1.0253**	**1.3642**	**1.3967**	**1.3967**	**1.0000**	**1.0000**	**1.0785**
3500	3599	**1.0269**	**1.3839**	**1.4134**	**1.4134**	**1.0000**	**1.0000**	**1.0826**
3600	3699	**1.0285**	**1.4032**	**1.4294**	**1.4294**	**1.0000**	**1.0000**	**1.0866**
3700	3799	**1.0301**	**1.4220**	**1.4449**	**1.4449**	**1.0000**	**1.0000**	**1.0905**
3800	3899	**1.0317**	**1.4406**	**1.4602**	**1.4602**	**1.0000**	**1.0000**	**1.0943**
3900	3999	**1.0334**	**1.4587**	**1.4749**	**1.4749**	**1.0000**	**1.0000**	**1.0979**
4000	4099	**1.0350**	**1.4768**	**1.4896**	**1.4896**	**1.0000**	**1.0000**	**1.1015**
4100	4199	**1.0366**	**1.4945**	**1.5043**	**1.5043**	**1.0000**	**1.0000**	**1.1049**
4200	4299	**1.0382**	**1.5122**	**1.5189**	**1.5189**	**1.0000**	**1.0000**	**1.1083**
4300	4399	**1.0398**	**1.5299**	**1.5336**	**1.5336**	**1.0000**	**1.0000**	**1.1115**
4400	4499	**1.0415**	**1.5471**	**1.5510**	**1.5510**	**1.0000**	**1.0000**	**1.1146**
4500	4599	**1.0431**	**1.5628**	**1.5799**	**1.5799**	**1.0000**	**1.0000**	**1.1176**
4600	4699	**1.0447**	**1.5785**	**1.6088**	**1.6088**	**1.0000**	**1.0000**	**1.1205**
4700	4799	**1.0464**	**1.5942**	**1.6377**	**1.6377**	**1.0000**	**1.0000**	**1.1232**

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SQUARE FOOTAGE FACTORS

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Minimum	Maximum	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
4800	4899	**1.0480**	**1.6098**	**1.6666**	**1.6666**	**1.0000**	**1.0000**	**1.1258**
4900	4999	**1.0496**	**1.6255**	**1.6955**	**1.6955**	**1.0000**	**1.0000**	**1.1284**
5000	5499	**1.0513**	**1.6412**	**1.7244**	**1.7244**	**1.0000**	**1.0000**	**1.1308**
5500	5999	**1.0595**	**1.7196**	**1.7894**	**1.7894**	**1.0000**	**1.0000**	**1.1408**
6000	6499	**1.0679**	**1.7979**	**1.8275**	**1.8275**	**1.0000**	**1.0000**	**1.1549**
6500	6999	**1.0764**	**1.8763**	**1.8539**	**1.8539**	**1.0000**	**1.0000**	**1.1642**
7000	7499	**1.0849**	**1.9159**	**1.8802**	**1.8802**	**1.0000**	**1.0000**	**1.1735**
7500	9999	**1.0934**	**1.9391**	**1.9551**	**1.9551**	**1.0000**	**1.0000**	**1.2015**
10000	and greater	**1.1359**	**2.0549**	**2.0504**	**2.0504**	**1.0000**	**1.0000**	**1.2341**

* Earthquake Shake is an optional coverage
** Liability and Medical Payments are optional coverages

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

NUMBER OF FAMILIES FACTORS

USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Number of Families	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
1	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
2	**1.0900**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
3	**1.2500**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
4+	**1.5950**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**

* Earthquake Shake is an optional coverage
** Liability and Medical Payments are optional coverages

State: **ARKANSAS**
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USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

MISCELLANEOUS RATING FACTORS

HOME PROTECTOR COVERAGE FACTOR
USAA GROUP
DWELLING
COVERAGE A

Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
1.1500	**1.1500**	**1.1500**	**1.1500**	**1.1500**	**1.0000**

BUILDER'S RISK FACTOR
USAA GROUP
DWELLING
COVERAGE A

Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
0.7000	**0.7000**	**0.7000**	**0.7000**	**0.7000**	**1.0000**

VACANT/UNOCCUPIED FACTOR
USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
1.5000	**1.5000**	**1.5000**	**1.5000**	**1.5000**	**1.5000**	**1.5000**

OTHER STRUCTURES COVERAGE AMOUNT FACTOR
USAA GROUP
DWELLING
COVERAGE A

Coverage B Amount	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
10% of Coverage A	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
15% of Coverage A	**1.0369**	**1.0369**	**1.0369**	**1.0455**	**1.0518**	**1.0000**
25% of Coverage A	**1.0813**	**1.0813**	**1.0813**	**1.1364**	**1.0847**	**1.0000**
50% of Coverage A	**1.1430**	**1.1430**	**1.1430**	**1.3473**	**1.2040**	**1.0000**
75% of Coverage A	**1.1989**	**1.1989**	**1.1989**	**1.5735**	**1.3995**	**1.0000**
100% of Coverage A	**1.2524**	**1.2524**	**1.2524**	**1.8182**	**1.4455**	**1.0000**

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	GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

MISCELLANEOUS RATING FACTORS

EARTHQUAKE SHAKE* ZONE FACTOR
USAA GROUP
ALL STRUCTURE TYPES
COVERAGE A, B, C and D

Zone	Factor
2	**10.5629**
3	**3.4978**
4	**1.0000**
5	**0.1987**

INCREASED LIABILITY LIMIT FACTOR
USAA GROUP
ALL STRUCTURE TYPES

Liability Limit	Factor
$300,000	**1.0000**
$500,000	**1.1154**
$1,000,000	**1.2769**

RATE CAPS

Structure Type	Limit	Type	USAA	USAA-CIC	USAA-GIC	Garrison
DWELLING	Lower	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
	Higher	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
CONDO	Lower	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
	Higher	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
MISCELLANEOUS	Lower	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**
	Higher	Increase	**25%**	**25%**	**25%**	**25%**
		Decrease	**25%**	**25%**	**25%**	**25%**

* Earthquake Shake is an optional coverage
** Liability and Medical Payments are optional coverages

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DISCOUNTS AND SURCHARGES

PROTECTIVE DEVICE CREDIT
USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
Monitored Fire Alarm	**0.9500**	--	--	--	--	--	--
Automatic Sprinklers in all areas except attic, bathroom, closet, and attached structures	**0.8000**	--	--	--	--	--	--

CLAIMS FREE DISCOUNT
USAA GROUP
DWELLING AND CONDO
ALL COVERAGES

Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special*** (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
0.9000	**0.9000**	**0.9000**	**0.9000**	**0.9000**	**0.9000**	**0.9000**

CLAIMS ACTIVITY SURCHARGE
USAA GROUP
DWELLING AND CONDO
COVERAGE A and C

Prior Non-Weather Claims	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
0	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**
1	**1.1710**	**1.1241**	**1.2909**	**1.2909**	**1.0000**	**1.0000**	**1.1823**
2	**1.5061**	**1.3107**	**1.6092**	**1.6092**	**1.0000**	**1.0000**	**1.5643**
3	**1.9214**	**1.5197**	**1.9107**	**1.9107**	**1.0000**	**1.0000**	**2.0502**
4	**2.3097**	**1.8662**	**2.2739**	**2.2739**	**1.0000**	**1.0000**	**2.7561**
for each add'l claim above 4 add:	**0.2600**	**0.5900**	**0.3200**	**0.3200**	**0.0000**	**0.0000**	**0.3200**

* Earthquake Shake is an optional coverage
** Liability and Medical Payments are optional coverages
*** Claims Free Discount factor for Special (Non-Catastrophe) also applies to Water Backup / Sump Pump coverage

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DISCOUNTS AND SURCHARGES

HOME AGE DISCOUNT
USAA GROUP
DWELLING
COVERAGE A and C

Dwelling Age (Years)	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
0	0.4116	0.3105	0.3707	0.3707	0.8630	1.0000	0.6541
1	0.4245	0.3416	0.4003	0.4003	0.8630	1.0000	0.6769
2	0.4387	0.3758	0.4324	0.4324	0.8630	1.0000	0.6981
3	0.4540	0.4134	0.4669	0.4669	0.8651	1.0000	0.7176
4	0.4704	0.4547	0.5044	0.5044	0.8673	1.0000	0.7354
5	0.4879	0.5002	0.5447	0.5447	0.8694	1.0000	0.7515
6	0.5063	0.5502	0.5883	0.5883	0.8715	1.0000	0.7661
7	0.5256	0.6052	0.6353	0.6353	0.8737	1.0000	0.7791
8	0.5457	0.6657	0.6862	0.6862	0.8758	1.0000	0.7907
9	0.5664	0.7323	0.7410	0.7410	0.8780	1.0000	0.8009
10	0.5877	0.8025	0.7892	0.7892	0.8801	1.0000	0.8098
11	0.6095	0.8655	0.8305	0.8305	0.8823	1.0000	0.8175
12	0.6316	0.9189	0.8660	0.8660	0.8845	1.0000	0.8241
13	0.6540	0.9602	0.8961	0.8961	0.8866	1.0000	0.8297
14	0.6765	0.9877	0.9213	0.9213	0.8888	1.0000	0.8345
15	0.6989	1.0000	0.9420	0.9420	0.8910	1.0000	0.8384
16	0.7213	1.0000	0.9590	0.9590	0.8932	1.0000	0.8416
17	0.7433	1.0000	0.9722	0.9722	0.8954	1.0000	0.8442
18	0.7650	1.0000	0.9825	0.9825	0.8976	1.0000	0.8463
19	0.7862	1.0000	0.9901	0.9901	0.8998	1.0000	0.8479
20	0.8068	1.0000	0.9954	0.9954	0.9020	1.0000	0.8491
21	0.8267	1.0000	0.9986	0.9986	0.9042	1.0000	0.8500
22	0.8457	1.0000	1.0000	1.0000	0.9065	1.0000	0.8507
23	0.8639	1.0000	0.9998	0.9998	0.9087	1.0000	0.8512
24	0.8811	1.0000	0.9983	0.9983	0.9109	1.0000	0.8516
25	0.8973	1.0000	0.9955	0.9955	0.9132	1.0000	0.8519
26	0.9123	1.0000	0.9918	0.9918	0.9154	1.0000	0.8521
27	0.9263	1.0000	0.9872	0.9872	0.9176	1.0000	0.8524
28	0.9391	1.0000	0.9818	0.9818	0.9199	1.0000	0.8527
29	0.9507	1.0000	0.9758	0.9758	0.9222	1.0000	0.8530
30	0.9611	1.0000	0.9692	0.9692	0.9244	1.0000	0.8535
31	0.9703	1.0000	0.9621	0.9621	0.9267	1.0000	0.8541
32	0.9784	1.0000	0.9546	0.9546	0.9290	1.0000	0.8548
33	0.9854	1.0000	0.9468	0.9468	0.9313	1.0000	0.8557
34	0.9912	1.0000	0.9390	0.9390	0.9336	1.0000	0.8568
35	1.0000	1.0000	0.9309	0.9309	0.9359	1.0000	0.8581
36	1.0000	1.0000	0.9223	0.9223	0.9382	1.0000	0.8595
37	1.0000	1.0000	0.9140	0.9140	0.9405	1.0000	0.8612
38	1.0000	1.0000	0.9053	0.9053	0.9428	1.0000	0.8631
39	1.0000	1.0000	0.8967	0.8967	0.9451	1.0000	0.8651
40	1.0000	1.0000	0.8882	0.8882	0.9474	1.0000	0.8674
41	1.0000	1.0000	0.8794	0.8794	0.9497	1.0000	0.8699

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USAA CASUALTY INSURANCE COMPANY
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GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DISCOUNTS AND SURCHARGES

HOME AGE DISCOUNT
USAA GROUP
DWELLING
COVERAGE A and C

Dwelling Age (Years)	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
42	1.0000	1.0000	0.8708	0.8708	0.9521	1.0000	0.8725
43	1.0000	1.0000	0.8624	0.8624	0.9544	1.0000	0.8754
44	1.0000	1.0000	0.8539	0.8539	0.9568	1.0000	0.8785
45	1.0000	1.0000	0.8452	0.8452	0.9591	1.0000	0.8817
46	1.0000	1.0000	0.8368	0.8368	0.9615	1.0000	0.8851
47	1.0000	1.0000	0.8287	0.8287	0.9638	1.0000	0.8887
48	1.0000	1.0000	0.8204	0.8204	0.9662	1.0000	0.8924
49	1.0000	1.0000	0.8122	0.8122	0.9686	1.0000	0.8962
50	1.0000	1.0000	0.8043	0.8043	0.9710	1.0000	0.9002
51	1.0000	1.0000	0.7963	0.7963	0.9734	1.0000	0.9043
52	1.0000	1.0000	0.7886	0.7886	0.9757	1.0000	0.9085
53	1.0000	1.0000	0.7810	0.7810	0.9781	1.0000	0.9128
54	1.0000	1.0000	0.7733	0.7733	0.9805	1.0000	0.9171
55	1.0000	1.0000	0.7660	0.7660	0.9830	1.0000	0.9215
56	1.0000	1.0000	0.7587	0.7587	0.9854	1.0000	0.9259
57	1.0000	1.0000	0.7514	0.7514	0.9878	1.0000	0.9304
58	1.0000	1.0000	0.7445	0.7445	0.9902	1.0000	0.9348
59	1.0000	1.0000	0.7372	0.7372	0.9927	1.0000	0.9393
60	1.0000	1.0000	0.7307	0.7307	0.9951	1.0000	0.9437
61	1.0000	1.0000	0.7238	0.7238	0.9975	1.0000	0.9481
62	1.0000	1.0000	0.7174	0.7174	1.0000	1.0000	0.9524
63	1.0000	1.0000	0.7110	0.7110	1.0000	1.0000	0.9568
64	1.0000	1.0000	0.7045	0.7045	1.0000	1.0000	0.9609
65	1.0000	1.0000	0.6985	0.6985	1.0000	1.0000	0.9650
66	1.0000	1.0000	0.6924	0.6924	1.0000	1.0000	0.9691
67	1.0000	1.0000	0.6863	0.6863	1.0000	1.0000	0.9731
68	1.0000	1.0000	0.6803	0.6803	1.0000	1.0000	0.9769
69	1.0000	1.0000	0.6748	0.6748	1.0000	1.0000	0.9805
70	1.0000	1.0000	0.6694	0.6694	1.0000	1.0000	0.9842
71	1.0000	1.0000	0.6638	0.6638	1.0000	1.0000	0.9876
72	1.0000	1.0000	0.6582	0.6582	1.0000	1.0000	0.9908
73	1.0000	1.0000	0.6532	0.6532	1.0000	1.0000	0.9940
74	1.0000	1.0000	0.6481	0.6481	1.0000	1.0000	0.9972
75	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
76	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
77	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000

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DISCOUNTS AND SURCHARGES

HOME AGE DISCOUNT
USAA GROUP
DWELLING
COVERAGE A and C

Dwelling Age (Years)	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake*	Liability / Medical Payments**
78	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
79	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
80	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
81	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
82	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
83	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
84	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
85	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
86	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
87	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
88	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
89	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
90	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
91	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
92	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
93	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
94	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
95	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
96	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
97	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
98	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
99	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000
100+	1.0000	1.0000	0.6430	0.6430	1.0000	1.0000	1.0000

* Earthquake Shake is an optional coverage
** Liability and Medical Payments are optional coverages

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DISCOUNTS AND SURCHARGES

MULTI-PRODUCT DISCOUNT*
USAA GROUP
DWELLING AND CONDO
ALL COVERAGES
RPI + Auto

Territory	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special** (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake***	Liability / Medical Payments****
All	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**

* Only one combination of the Multi-Product Discount can apply
** Special (Non-Catastrophe) factor also applies to Water Backup / Sump Pump coverage
*** Earthquake Shake is an optional coverage
**** Liability and Medical Payments are optional coverages

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DISCOUNTS AND SURCHARGES

MULTI-PRODUCT DISCOUNT*
USAA GROUP
DWELLING AND CONDO
ALL COVERAGES
RPI + Homeowners/Renters

Territory	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special** (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake***	Liability / Medical Payments****
All	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**	**0.9500**

* Only one combination of the Multi-Product Discount can apply
** Special (Non-Catastrophe) factor also applies to Water Backup / Sump Pump coverage
*** Earthquake Shake is an optional coverage
**** Liability and Medical Payments are optional coverages

State: **ARKANSAS**
Line of Business: **RENTAL PROPERTY INSURANCE**
Effective: **OCTOBER 31, 2014 (NEW BUSINESS written on or after OCTOBER 18, 2014)**
JANUARY 1, 2015 (RENEWAL BUSINESS)
Companies: **UNITED SERVICES AUTOMOBILE ASSOCIATION**
USAA CASUALTY INSURANCE COMPANY
USAA GENERAL INDEMNITY COMPANY
GARRISON PROPERTY AND CASUALTY INSURANCE COMPANY

DISCOUNTS AND SURCHARGES

MULTI-PRODUCT DISCOUNT*
USAA GROUP
DWELLING AND CONDO
ALL COVERAGES
RPI + Auto + Homeowners/Renters

Territory	Fire (Non-Catastrophe)	EC (Non-Catastrophe)	Broad (Non-Catastrophe)	Special** (Non-Catastrophe)	Fire Following Earthquake	Earthquake Shake***	Liability / Medical Payments****
All	**0.9000**	**0.9000**	**0.9000**	**0.9000**	**0.9000**	**0.9000**	**0.9000**

* Only one combination of the Multi-Product Discount can apply
** Special (Non-Catastrophe) factor also applies to Water Backup / Sump Pump coverage
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OTHER COVERAGES

INCREASED FAIR RENTAL VALUE
DWELLING

	BASE RATE PER $1,000			
	USAA	USAA-CIC	USAA-GIC	Garrison
Fire	**2.20**	**3.15**	**3.15**	**3.15**
EC	**0.91**	**1.33**	**1.33**	**1.33**
Special	**0.90**	**1.31**	**1.31**	**1.31**
Earthquake Shake*	**0.19**	**0.19**	**0.19**	**0.19**

INCREASED FAIR RENTAL VALUE
CONDO

	BASE RATE PER $1,000			
	USAA	USAA-CIC	USAA-GIC	Garrison
Fire	**2.19**	**3.32**	**3.32**	**3.32**
EC	**0.91**	**1.33**	**1.33**	**1.33**
Special	**0.90**	**1.31**	**1.31**	**1.31**
Earthquake Shake*	**0.19**	**0.19**	**0.19**	**0.19**

WATER BACKUP/SUMP PUMP OVERFLOW
DWELLING AND CONDO

BASE RATE	USAA	USAA-CIC	USAA-GIC	Garrison
	57.00	**57.00**	**57.00**	**57.00**

* Earthquake Shake is an optional coverage